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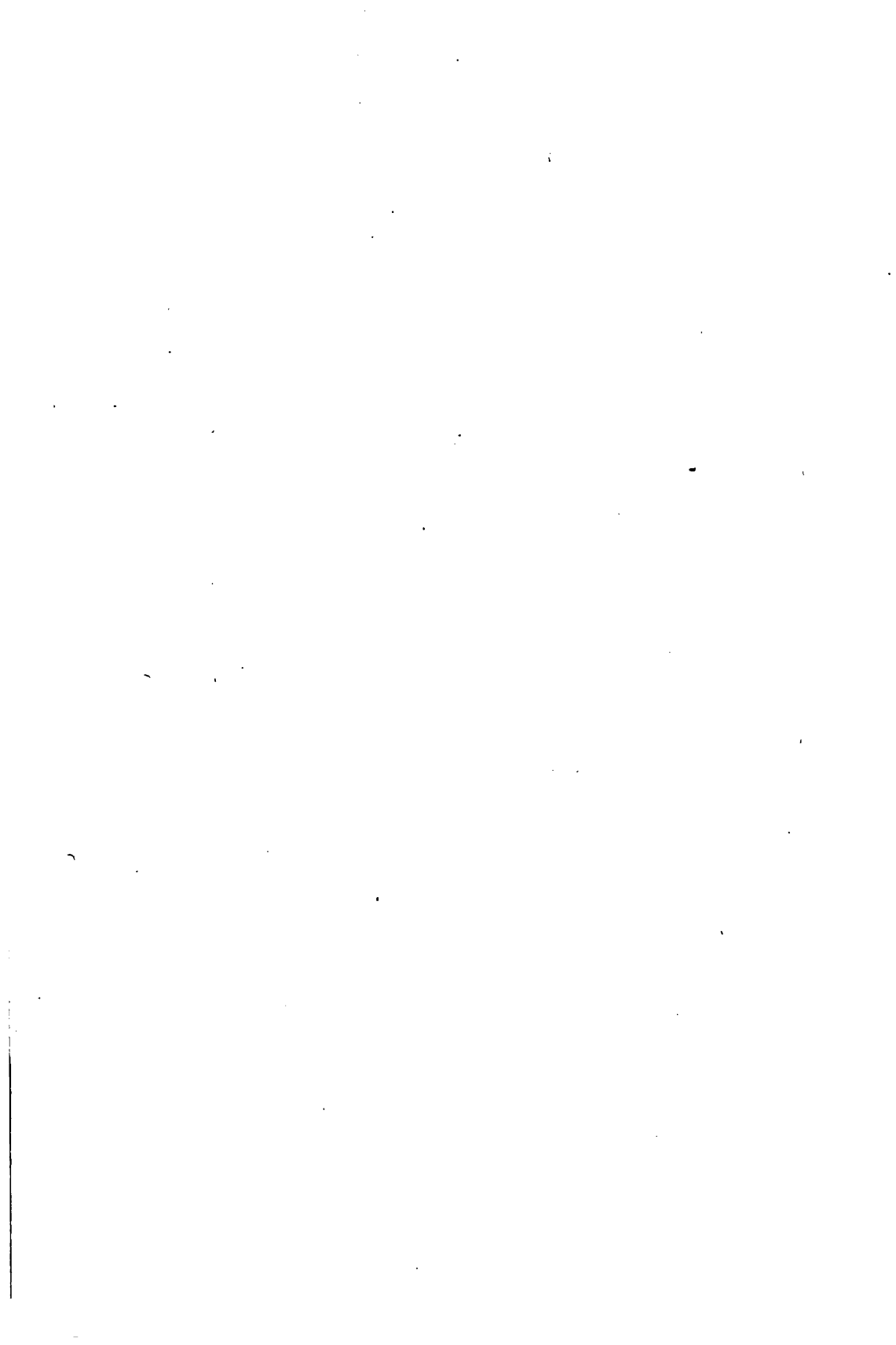
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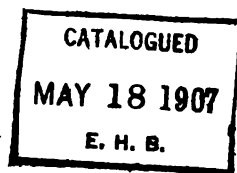
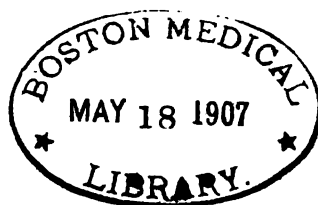
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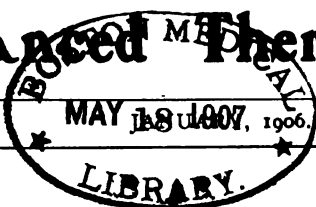
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CHOICE OF METHODS IN THE TREATMENT OF
 OPERABLE CASES OF CANCER.*

BY G. BETTON MASSEY, M. D.,

Attending Surgeon, American Oncologic Hospital, Philadelphia.

By the expression "operable cases of cancer" reference is made to those malignant growths which are so situated and delimited as to be thought capable of entire removal by a surgical procedure, and which are supposed to be yet free from daughter tumors in other portions of the body. Such classification is, of course, uncertain. The fact remains, however, that the interests of our patients demand a liberal interpretation of the term "operable," even if it involves many instances of defeat to ourselves, for our negative conclusions as to the possibility of cure are liable to be wrong as well as our positive ones, involving the ultimate loss of lives from inaction that might have been saved by a bolder course.

The discussion of the proper methods to employ in operable cases of cancer is the most important subject in oncology to-day, aside from the etiology of malignant tumors, and one that is greatly neglected; for it should be recalled that our voluminous literature on radiotherapy is chiefly concerned with inoperable cases. If we are to cure any considerable proportion of cancerous growths we must cure them in their early stages, and must create a sentiment in favor of early application for relief. No other course will arrest the onward progress of this scourge of humanity.

The average medical mind yet turns to the knife as the only surgical procedure known for operable carcinoma and sarcoma; even members of this Association occasionally betray this mental attitude in debate, unmindful of the surgical possibilities

* Read at the Fourteenth Annual Meeting of the American Electro-Therapeutic Association at the New York Academy of Medicine, September 19, 1905.

of electro-chemistry, with its many advantages in certain cases due to greater thoroughness of destruction, bloodlessness, absolute asepsis and antisepsis, controllability of effect within cavities, and sterilization of the edges of the wound. Yet the question remains with the most skillful users of this force whether this method, the knife, or radiotherapy is best adapted to an individual case, and it is in the hope of throwing light on this problem that these brief remarks are presented.

In the Oncologic Hospital recently founded in Philadelphia, and now in active operation, an effort is being made to determine the present condition of our knowledge of this question under unusually favorable auspices, for the staff includes special workers in each method, and the policy of the hospital is the admission of operable cases only, or those that are supposed to be operable. The hospital has now been open eight months, and the number of cases subjected to each method during this time may be taken as an attempt to solve practically the proportions of operable cases suitable to each method, in the opinion of the several operators.

During the eight months 103 cases were under treatment, of which number 9 were found unsuitable for any kind of curative treatment, owing to inaccessibility of situation or general systemic invasion. Of the remaining 94 cases 64 were treated by cataphoric operations: 17 by Roentgen rays; 5 by knife operations; 4 by both cataphoresis and X-ray; 2 by cataphoresis and the knife; and 2 by the knife and X-rays.

The per cent. of those treated by each method would therefore be as follows:

Cataphoric operations	68 per cent.
Radiotherapy	18 " "
Knife operations	5 " "
Combinations of above methods	9 " "

It is too early yet to analyze the results of this work, as many of these cases are still under observation and should remain under observation for some time, yet it may be said that of the 94 cases 32 have been discharged with no evidence of disease remaining.

The large proportion of these cases subjected to cataphoresis in the Oncologic Hospital may be in part due to the fact that two out of the four operators are enthusiastic in this work, yet I believe that a study of the ultimate results in these cases at the proper time will disclose substantial reasons why even more than two-thirds of early malignant growths on the exterior of the body and in accessible cavities should be treated in this way if the best results are to be attained.

Taking up the specific reasons for a choice in each variety is, however, a large task and difficult of statement in detail in

the time at my disposal. Remembering that I allude only to apparently operable cases, I may say that the knife may be preferred in an early, diffuse carcinoma of the breast, when the whole breast seems involved without involvement of the underlying tissues or the axilla. The amputation of such a breast is simpler than its total destruction by cataphoresis, though scarcely a shorter operation. If the underlying tissues are involved, or the axilla be invaded, I believe an extensive cataphoric operation offers greater chance of cure.

Malignant disease confined to an organ easily removed, such as the eye, testicle, or abdominal organs, should be subjected to the knife. Not so the lip, face, tongue, cervix uteri, rectum, or other parts difficult of delimitation. In these situations cataphoresis is infinitely preferable.

Turning to the Roentgen rays, it may be said that a considerable proportion of the minor cases subjected to cataphoresis in the Oncologic Hospital would have been treated by these rays in other hands, and that there is a wide overlapping of cases suitable to each. Yet many of our cases of small skin growths that were cured by a thirty-minute application of cataphoresis had received prolonged applications of X-rays in able hands elsewhere without result. And in a small growth or ulceration the choice between a harmless application of a few minutes and a prolonged series of dangerous applications of an uncertain force ought to be easily made.

The cases referred to the radio-therapeutic clinic by preference, aside from the failures under other methods, are those in which a very extensive surface is but superficially involved, or where a surface growth is so situated as to be incapable of destruction by cataphoresis without destroying important structures.

Conclusions.

(1) The question of the best method of treatment for operable cancerous growths is far more important than that of the inoperable, for the only real progress will be made in the early treatment of these growths.

(2) Results already attained in the Oncologic Hospital indicate, in the opinion of the writer, that over two-thirds of early cases of malignant disease are best treated by the cataphoric operation.

(3) The knife is most useful when an entire organ in which an incipient growth has appeared may be removed, and least useful when the limits of the growth are difficult of determination.

(4) Roentgen rays are indicated in the early treatment of cancer when a superficial growth is too extensive for destruction by cataphoresis. Small superficial growths should not be subjected to this slow and uncertain method alone when they may be destroyed in a few minutes by cataphoresis.

Discussion.

Dr. Richard Joseph Nunn, Savannah, Ga.: My experience with the use of cataphoresis and the Roentgen ray has been very favorable. There is nothing in this particular paper that calls for any extensive discussion on my part. The ordinary private practitioner has not had the opportunity of acquiring sufficient expert knowledge of this character for his remarks to be of any value. We have rather to depend for our information on just this kind of communication from the experienced specialist.

Dr. Robert Reyburn: I have heard this paper with great interest. My own experience in the direction of this paper has been very limited. At the same time I think I may say that I agree with Dr. Massey, where there is a large tumor superficially, too large to be amenable to cataphoresis, that we use the knife. As a rule I object to the use of the knife, unless it is absolutely impossible to treat the affection in any other way, and in the great majority of cases the cancerous growth extends beyond the growth of the tumor. The use of the knife is therefore only limited by small-sized tumors. My great objection is to a large quantity of tissue, and I intend to give special attention to this subject. We should try to limit the focus of infection when we use the knife, for the reason that, if we use the knife for a tumor and destroy the tissues around it, then we infect. For this reason I would also like to see all operations for cancer done under ether. I believe cancer to be the result of devitalized tissue being absorbed by certain parts of the body, and when the blood of the patient is already in a receptive condition any part of the body is liable to produce cancer.

Although my own experience is rather large in this matter, I cannot devote my whole time to the subject, but have come to the conclusion that the treatment for this and other maladies should not only be by local, but also considerate constitutional means. I hope most earnestly that all of you who are here to-night will try to develop that idea, and in that case I feel sure that in another year we shall see very much better results in the treatment of cancer.

Dr. Snow: I have been much interested in Dr. Massey's paper, because in it he has so definitely indicated the particular cases where the various methods of treatment have given the best results in his experience, and while I agree with the doctor generally in his consideration of the subject, I think that a very broad field has been omitted from consideration, and that is the combined use of two or more methods in most cases, such as the surgical method or that of Dr. Massey in combination with the X-ray. When we use the X-ray in connection with the treatment of recurrent cancer and see, as a result, the gradual dissolution and disappearance of the growth, we are

at once in a position to say that this agent should be ignored in no case. I confidently believe that the man who undertakes the cure of cancer by a treatment excluding the surgical methods, when the X-ray would require months to remove the mass, would be very foolhardy. I sincerely believe, however, that the first step in the treatment of all cases is the employment of the X-ray. Dr. Massey and others who have spoken on the subject have suggested the thought that there were foci of infection in the immediate surroundings of the main site of the growth, and, as has been suggested, we never can tell where the limit is, so that the knife offers no greater chance of their destruction. I therefore believe that the X-ray is indicated in all cases. The day is coming, and not far distant, when surgeons, whether they use Dr. Massey's method or the knife, must grant this point. I believe the time will come within ten years when it will be considered bad practice to ever ignore the X-ray in the treatment of cancer. In recurrent cancer it can be used where there are surrounding foci. The inoperable cases which have been given up as hopeless have used the X-ray and positive results have been obtained, though as a rule not sufficient for a cure.

Conditions should be treated with the idea that other involvement than the tumor is present. We first use the X-ray quite extensively in the region of the cancerous mass which is to be later removed by some surgical procedure. In Dr. Massey's method there is one danger—secondary hemorrhage, and for that reason the case requires treatment in a hospital, where prompt service can be rendered to stop the hemorrhage. I have observed also that a long time is required in extensive cases to repair the open wound; this, however, is not a great objection.

I do not believe that the surgical procedure which removes the axillary glands—Halsted method—is good practice, in the light of the combined use of the X-ray. Glands are placed there to prevent the spread of infection; and their removal means an opened way when recurrence does take place, and the judicious use of the X-ray precludes the supposed justification for such a radical operation.

Dr. Bishop: My work has not been much in the line of electro-chemical surgery, but what little I have done has made me look very favorably upon Dr. Massey's method of treating cancer. It seems to me that the question as to which is the best method is not one to be determined by a few cases or by argument. Dr. Massey has treated his cases by this method for a great many years, and it would be interesting to the Association if he would tell us how many cases of recurrence he has had in the course of these years. We know that in surgical cases there are many, and it would be interesting to compare how many there are proportionately between the knife, cataphoresis, and the X-ray.

Dr. Massey: Dr. Bishop's question as to the relative frequency of recurrences is difficult to answer. In both my hospital and private practice—and the latter extends back in this particular line to 1893—nearly all the patients were on their last legs, and there were many failures. But the failures were oftener due to the continued development of pre-existent internal metastases than to recurrences, the local result remaining good in spite of the unchecked advance of the internal implantation. There have been local failures to eradicate also, but these were at first largely due to the batteries breaking down and spoiling the work. Of these older cases, nevertheless, about thirty per cent. have been successfully treated, the patients being either living or having died without recurrence having taken place in the original spot. Of the whole number, about twenty per cent. have really been saved and are living to-day. When the results of the recent cases referred to in the paper can be reliably determined I believe that these figures will be greatly increased, as a far larger number were in the earlier stages. Fully fifty per cent. have been discharged as apparently cured.

In reply to Dr. Snow I would say that my paper referred only to the earlier operable cases, and not to advanced carcinomas. Pre-operative radiotherapy may be a good thing in some of these cases—I have indeed had evidences of its value—but post-operative radiation has the disadvantage of interfering with the natural granulations in such a way as to cover up uncertain spots. A very important part of my method is the most careful watchfulness of the granulating process and the prompt employment of minor cataphoresis if a doubtful elevation shows itself while the healing is going on. We do not employ radiotherapy until hope of this immediate destruction is abandoned.

As I have said, the interests of the patient must make us liberal in the classification of operable cases. Doubt will often exist as to whether a given case is suffering only from the local disease, and therefore amenable to a major application, or is cachectic from internal dissemination. This doubt may be cleared up by placing the patient under the method. If the getting up from the operation is prompt there is no metastasis, or, at worst, it exists in but an early and slight development and will be slow to show its effects. If, on the other hand, the patient remains weaker after the operation the indications point to the presence of a daughter growth in an internal organ. It is often our duty to give the patient the benefit of this doubt.

Secondary hemorrhage seldom occurs, and cannot be serious in a hospital. Simple compression is the proper method of controlling it. In the sixty-odd cases treated in the hospital, in which a larger number of operations have been done, there was only one hemorrhage, and this did not result in the death of the patient.

THE ROENTGEN TREATMENT OF TUBERCULAR GLANDS.*

BY GEORGE COFFIN JOHNSTON, M. D., PITTSBURG, PA.

Tubercular adenitis has in the last twenty years ceased to be considered as belonging to the domain of medicine, and the treatment of this important disease has by common consent been transferred to the surgeon. There is no doubt, as a review of the reports of various operators will show, that the results of surgical treatment have been far more satisfactory than those following the most careful medicinal measures, and upon the whole satisfactory where radical surgery has been employed. An enormous literature upon this subject is open to the student and will be found interesting and instructive.

The surgeons are by no means in harmony, however, regarding the final result of operation or the method to be employed. The disease should be regarded seriously, not on account of its immediate results or the scarring which follows neglected cases, but on account of the tendency to a tubercular invasion of other parts of the body; thus Demme (1) of Berne reports 692 patients treated medicinally of whom 21 per cent. developed pulmonary tuberculosis and 8.2 per cent. developed tuberculosis of the intestines, meninges, etc. Other observers show from 26 to 28 per cent. of cases developed pulmonary tuberculosis following operation.

Fischer (2) has tabulated 1273 cases, several years after operation, with the following results: Cured, 57.65 per cent.; local recurrence, 21.84 per cent.; died, 13.51 per cent.; thus it is shown that practically 60 per cent. of cure may be expected following surgical procedure, but the tendency to recurrence is high, and tuberculosis of other organs is a very frequent sequela.

Statistics show that the total extirpation of the infected glands is by far the preferable procedure, since if it does not result in cure it is certain to be followed by a marked improvement in the condition of the patient.

Karewski (3), with an experience of 250 cases, Jordan (4), with an experience of over 400 cases, and Mitchell (5), 170

* Read before the Fourteenth Annual Session of the American Electro-Therapeutic Association at the New York Academy of Medicine, September 20, 1905. -

cases, all advocate complete radical removal, and strongly deprecate partial excision and incomplete operation. The prognosis is better the younger the patient.

Dowd (6) of New York reports 100 cases of complete operations with a careful study of the cases following operation and microscopical examination of the excised tissue in all but 18 cases. He calls attention to the fact that most of the patients applied for treatment in the late winter or spring, following the throat inflammations common during this season. The majority of these cases were from unsanitary surroundings, but 20 per cent. developed the disease in comfortable environment. Heredity he apparently disregards. The most common port of infection he believes to be the throat, and quotes a number of observers in support of this view. Evidence is advanced that the tubercle bacillus is able to pass through the mucous membrane and infect the lymphatics, even though the mucous membrane be healthy. He believes Wright's description that the mucous membrane absorbs, the lymphoid tissue harbors, and the lymph chains carry the tubercle bacillus—to be accurate. Infection may also take place from cases of pulmonary tuberculosis or from the teeth.

The deep cervical chain of glands is the most important in this connection, since it drains the posterior pharynx, nose, and much of the mouth, and this chain was apparently the first to be involved in 86 per cent. of his cases. The difficulties dependent upon complete surgical removal are many, on account of the important structures which must necessarily be avoided and the extensive dissection necessary in order that all disease may be eradicated. In the cervical type, to the consideration of which I shall devote this paper, the three important structures necessary to avoid during operation are the internal jugular vein, the spinal accessory nerve, and some fibers of the facial. The thoracic duct, the phrenic, pneumogastric, hypoglossal, and some branches in the cervical plexus are occasionally in jeopardy during the operation, but are less liable to injury and are easily avoided. If by chance the internal jugular should be wounded, it can be ligated without danger, although 3 fatal cases have been recorded. Division of the spinal accessory nerve results in a paralysis of the muscles about the shoulder, followed by deformity and atrophy of the muscles.

Dowd (6) illustrates a case of paralysis of the depressor labii inferioris of ten years' standing, following operation during which the lower filament of the facial nerve was divided. The operation, therefore, is one calling for a rather high degree of surgical skill and an extensive anatomical knowledge. In his series of 134 cases he has had no deaths, and other operators have reported from 300 to 400 cases without mortality; occasionally fatal cases, however, occur.

It appears, therefore, from a study of this excellent paper that the skilled operator performing the radical operation in tuberculosis of the cervical lymphatics may expect a death-rate that may be practically ignored, freedom from recurrence in about 75 per cent. of favorable cases, and 50 per cent. to 55 per cent. of less favorable cases, and an ultimate cure in from 70 per cent. to 90 per cent., with but slight scarring and small danger of any other untoward results. This is certainly much better than the results which follow the most careful medical treatment, and reflects honor upon the profession.

The so-called recurrences, however, I am inclined to term rather reinfections, and it is but reasonable to expect that so long as the primary seat of infection remains and there also remains a single gland following operation, there is no reason why this gland or glands should not in their turn become infected, thus simulating a recurrence. For this reason I do not expect that the ensuing years will show a betterment in the percentage of successful surgical cases, since it is manifestly impossible without prolonging the operation to the danger-point to remove all the lymphatic glands in the cervical chain.

Since complete surgical removal is able to show such a highly commendable percentage of successful results, it may seem impertinent to suggest the employment of any other remedial measures in a disease whose treatment seems so eminently satisfactory by surgical means, yet I believe that in the Roentgen ray, properly administered, the profession possess a means of treatment in tuberculosis of the glands, wherever situated, that is capable of producing results as complete and permanent as those obtained by the most skillful surgical procedure and attended by much better cosmetic effects. It is true that this treatment is tedious, requires the services of an expert, is not always successful, and is attended

by some small degree of danger, yet in common with surgical measures, the dangers diminish with the skill and experience of the operator, and the percentage of successful results increases directly.

My reason for presenting a plea in favor of this procedure is in direct response to what I believe to be the demands of the surgical profession.

Bullitt (7) of Kentucky, himself a surgeon, in his address before the Roentgen Ray Society, at the fifth annual meeting in St. Louis, said: "If it can be shown that there is reasonable grounds for believing that the Roentgen ray, or even any form of light, is capable of exercising a beneficial influence in tuberculosis, there is no doubt that the surgeon would be as willing to pass such patients on to the Roentgen-ray worker as he has shown himself glad to refer malignant disease, either after operation or without operation in the surgically hopeless cases."

"As to whether these glands in the neck should be radically removed by excision has been something of a battleground for some years. Many surgeons have been content to curette out broken-down glands, and to do nothing but palliate until breaking down occurs, always in the hope that general treatment, having for its object improved nutrition, will bring about spontaneous arrest or even cure before breaking down occurs. More radical surgeons, and these are the great majority, favor radical removal by clean dissection of tuberculous glands which progressively enlarge or evince a tendency to break down. In the great majority of these cases the glands involved are the cervical groups, superficial and deep, whose total extirpation involves a difficult and dangerous dissection among tissues of great importance. No matter how far such a dissection may be carried, it is almost invariable that still further and deeper are other lymphatic glands which elude the most careful search, and these in time become enlarged and have to be removed; sometimes three or four operations have to be undertaken. Persisting sinuses not unfrequently follow these operations, and especially is this apt to be the case when operation is undertaken in the face of broken-down glands or periglandular abscesses."

A collection of 226 cases of tuberculosis of lymphatic glands collected by James G. Bullitt shows 35 per cent. of cure, 40

per cent. improved, and 25 per cent. unimproved under Roentgen ray treatment. This tabulation of cases, taking in the work of operators of various degrees of experience and employing widely different technic, yet shows a remarkable effect to have been manifested.

The statistics of selected operators will show percentages of cure ranging from 60 per cent. to 85 per cent., and failure to improve in but very few cases. When it is remembered that observers almost all agree in describing a series of remarkable changes occurring in glandular tissue, both healthy and diseased, when submitted to Roentgen radiation, it is easy to understand why a curative effect should follow the application of this agent in this disease.

Roentgen ray cures tuberculosis of glands, not through its bactericidal effect, but by producing a series of changes resulting in the atrophy of the glandular stroma and its replacement by connective tissue—a sclerosis or fibrosis, so to speak. That this result is a constant sequel to the application of therapeutic doses is attested by no less an authority than Chas. H. Mayo (8). Operating upon several cases of adenitis following their exposure to X-ray he noticed the lymph system greatly sclerosed, and so impressed was he with the evidence of the activity of the ray in this direction, that he caused the treatment to be applied to 10 cases of very marked exophthalmic goiter; first to reduce glandular activity, and second, to reduce absorption by a possible effect on the lymphatics, with such marked benefit that he considers the X-ray to have a place in the treatment of this disease if only as a preparatory measure to prospective surgical methods later. All the cases were improved. I consider, therefore, that it is admitted by the surgeons that the X-ray has a most pronounced effect upon glandular tissue.

My results in the treatment of tubercular adenitis have been most satisfactory. In no cases have I recorded a failure to receive at least marked benefit from treatment. Cases that have been repeatedly submitted to operation, only to develop tubercular trouble in other glands in the same or a different locality, have under treatment shown a reduction in the sizes of the glands so marked as to render them difficult of detection, with a cessation of discharge from the sinuses and in each case a marked gain in health and strength. Where the de-

structive process is so far advanced that suppuration is imminent, X-ray treatment seems only to hasten the formation of pus, and where this occurs prompt incision and evacuation is indicated, but no attempt at curettement need be made.

In those cases where destruction of glandular tissue has not begun, treatment results in a prompt reduction in the sizes of the tumor masses, lessening of pain and soreness and a subsidence of the inflammation. I have observed, in common with some of the European authors, a marked curative effect consequent to a degree of dermatitis quickly produced, hence it has become my custom, where the patient's consent can be obtained, to produce a moderate degree of dermatitis as quickly as possible. This need only be sufficient to be followed by some tanning and superficial desquamation. So far I have had no recurrence since I have observed the precaution of raying widely the surrounding tissues.

In cervical adenitis it is wisdom to ray the entire neck as high as the ear, the lower jaw, the shoulders, and upper chest. A complete disappearance of the involved glands need scarcely be expected, nor do I believe it necessary for the production of a complete and permanent cure.

A gland that has been enlarged to forty or fifty times its normal size will remain as a small, round intensely hard mass of fibroid tissue, entirely without semblance to glandular tissue, and remaining without danger or inconvenience to the patient. If it should be in a location where its presence is unsightly or inconvenient, it may be removed, surgically by an incision, so small as to be unnoticeable, and the operation without danger to the patient. My cases have all been adults, in whom the prognosis is not so good as in children, and excepting one case, all had previously been submitted to one or several operations. The patients have without exception been more than gratified with the results, and the physicians who referred them are referring others. What the permanence of these results will be, time alone can tell, but even if recurrence should occur there is no reason why it should not be more easily and quickly removed under the same treatment, than was the original disease.

The technic of treatment does not differ extensively from that employed in the treatment of carcinomatous glandular involvement, except that I have found the production of a degree of dermatitis, early in the treatment, to markedly

shorten it. A tube of medium penetration, placed at a distance of ten inches, carrying a current not to exceed 1-2 to 2 milliamperes, the current derived from a coil operated by a mercury dip, giving 800 to 1000 interruptions per minute, is employed and an exposure of ten minutes on alternate days is given.

The advantages of the treatment are: first, relative freedom from danger; second, absence of pain during or after treatment; third, relief of pain if present; fourth, freedom from disfiguring scars; fifth, no hemorrhage or shock; sixth, no resulting paralysis or deformity.

Its disadvantages are: first, the length of time necessary to effect a cure, usually three months; second, its expense; third, the necessity for the employment of an expert to administer the treatment; fourth, the fact that time has not elapsed sufficient to demonstrate the permanence of the many apparent cures reported.

In view of the important fact that tubercular adenitis is prone to lead in very many cases to a fatal form of tuberculosis in other parts of the body, and that the fear (unjustifiable, but present) of surgical extirpation leads many of these cases into dangerous procrastinations, I believe that the knowledge of the existence of a favorable means of successful treatment for this condition should not be confined to the few, but should become prevalent among the medical profession and that all of these cases should be submitted as early as possible to a radical extirpation or a thorough course of radiotherapy at the discretion of the physician in charge.

Moreover, following the most careful extirpation of all apparently infected glands, a post-operative series of radiations will have a powerful tendency to prevent the development of similar trouble in such glands as must necessarily remain following such operation.

514 Bijou Building.

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- (8) Charles H. Mayo, *Medical Record*, November 8, 1904.

Discussion.

President: During the fourteen years I had charge of the Surgical Division at the St. Joseph's Hospital of this city, I had opportunities to see tuberculosis of the various glands in all stages of pathological changes. From young to old, these patients represented all classes and races—Caucasian, Indian, Chinese, Negro, etc. It seemed that the St. Joseph's Hospital was the reception hospital for tubercular disease from all the hospitals in the vicinity of New York. For the treatment of the tubercular glands, I used the serum-therapy of Dr. Koch and the usual surgical measures. I fully agree with Dr. Johnston in regard to surgery in this respect, and doubtless surgical procedures will soon be discarded in favor of radiotherapy and post-radiotherapy, which seems to my way of thinking the best way of treating this affection. In our St. Joseph's Hospital we had the services of many of the best surgical operators in New York; although no fault of theirs, many of their cases of tubercular adenitis were followed by pulmonary involvement, and death. Many of these patients were the worst of their kind physically. A number of them did show improvement and were greatly benefited owing to changes in their new hygienic surroundings and dietary. We found that intemperance was a great factor. At one time it was suggested that patients should receive stimulants, which they did, but latterly we found that under a treatment of the various preparations of malt and cod-liver oil the patients did just as well. We also used the milk treatment; in fact, we were willing to try any form of judicious treatment, so long as we could get results. The best results were derived from the better hygienic surroundings, appropriate diet, sleep, rest, and light work outdoors.

In the matter of abscesses I would use anesthesia, but only when necessary; then only very little of it, owing to the bad after-effect of ether and chloroform. Otherwise we would simply use surgical cleanliness and did not interfere more than was absolutely necessary. At the present moment the results are better than they have been, because people have been taught to observe better hygiene, dietary, temperance, etc.

Dr. Massey: Dr. Johnston has taken the words out of my mouth in depicting the dangers of tuberculous adenitis and

also the serious nature of the accepted surgical work for its removal, as represented in medical literature of the past year. I intended to write a paper on this subject, but other duties prevented me giving the necessary time to it. But the continued use of the X-rays displays an absolute failure to recognize the splendid work accomplished by cataphoresis in these troubles. At the Atlantic City meeting did I not show a little girl that was treated by cataphoresis? She was the child of the cleaner of the office building in which my office is situated, living in unhygienic surroundings with a mother full of tuberculous deposits. That little child is two or three years older now, and has developed into a young woman of excellent health, and you cannot find the scars left by the treatment. There was no risk of having all her vessels and glands sclerosed by destructive X-ray treatment; the method merely sterilized the focus of disease in the center of that gland, and I do not doubt that some of the glandular tissue is still functioning. That is an important point.

I have not recently looked up the eight or ten cases treated by this method, but I predict that I would get one hundred per cent. of successes in a thousand cases. Locate the center of the disease, and after the treatment of two or three of the worst glands the patient will recover, without whisky or cod-liver oil or opening the windows.

You destroy the disease in the worst glands, and this acts as such a tonic that there is complete recovery of health and retrogression of the remaining diseased foci. It required from six to eleven applications to destroy each glandular focus.

In making these applications the patient reclines on a couch with a negative pad in contact with the back or abdomen. The positive electrode is a sliver of zinc cut with scissors from the ordinary sheet zinc of stove dealers with a conducting wire attached, made of a piece of No. 30 copper wire. The tip of the zinc sliver or needle is amalgamated by dipping in weak sulphuric acid and mercury and inserted directly into the sinus, if an opening exist, or an opening is made with a Hagedorn needle through the skin if none exists, and from 1 to 5 milliamperes is turned on and allowed to continue for fifteen minutes. If a sinus exists, or has been made by previous treatment, the needle is insulated with fused sealing wax except at its tip, and more current may be used. A given gland will be sterilized in from five to twenty applications, when you allow the sinus to close. The scars made are quite inconspicuous, and often disappear in time.

Dr. Morton: I did not arrive in time to hear Dr. Johnston's

paper read, but knowing who wrote it, I am sure that the subject was well presented. I gather from the discussion that the point is that tubercular glands can be cured by the use of the X-ray. I am glad to add my affirmative testimony to that, and can state that in my opinion there is no better method of treatment. My own cases have not been many, but I can recall at least eight of which six were cured by the X-ray, although I should add that I also gave considerable doses of fluorescin. I noted in the cases that I treated with fluorescin that my results were more rapid, I think by about half the time. Only cervical and bad cases have come to me, by which I mean cases with tubercular glands extending from the ear to the shoulder and previously operated upon surgically often. In some of the cases there have existed open sinuses. The discharges ceased in four to six weeks entirely and then totally disappeared. I think, myself, fluorescin has a good deal to do with the success, although I should say that the suggestion made by Dr. Massey of applying cataphoresis in the center of the gland itself should be a valuable one. I do not see why we should not resort to the zinc needle if we feel inclined to do so. Why should we be bound by a hard and fast rule in the treatment of this disease? We change our views from day to day, science never stands still, so there is no reason why we should apply the rule of thumb, and decline newer and better methods. Certainly the knife is far from a success in the extirpation of tubercular glands, and the reason is that it does not find all of them. The X-ray finds those that the knife does not. Why, then, not adopt the more sensible policy? I can verify Dr. Johnston's standpoint and say that the X-ray cures tubercular glands and is better than the knife.

Dr. Titus: I take a personal interest in Dr. Johnston's paper because of my experience with a number of similar cases. I wish to call attention to one of the factors which is responsible for many of the cases of enlarged cervical glands. The most prominent cause of the trouble is, I believe, due to the presence of adenoids which act as an avenue of infection. If you remove the adenoid tissue as a precautionary measure, you will have better success with the X-ray and less tendency to recurrence from reinfection.

Dr. Herdman: I rise to explain that it is not that we have no means of tackling this trouble in advance of surgical methods, but that we have a richness of means from which it is difficult to select the proper one. I add my own testimony to that of Dr. Titus, that it is all a question as to the means by which these glands become infected. No attempt should be made to cure this trouble, whether it is by electro-therapeutics, the Roentgen ray, or surgical work, without first making the attempt to remove the adenoids when present. There is also evidence of what Dr. Massey has already shown, that the dis-

integrating influence of the X-ray is a most admirable means of dealing with these glands. In Dr. Holme's Sanitarium there are chiefly only incipient cases of tubercular glands, and there they have evidently every convenience at their disposal. From a letter I have received, I learn that high tension and high frequency are applied. This is additional evidence that we have a variety of means of bringing about a destructive action on these tubercular deposits which, if left alone, are going to infect the entire system. I repeat, therefore, we stand before a choice in the richness of remedies.

Dr. M. F. Wheatland: I thought mention should have been made of the fact that bad teeth are one of the most frequent sources of infection.

President: In the matter of tubercular infection, have our members noticed the probability of bedbugs being a source of infection on the same grounds that the mosquito has been found to be a disease-carrying insect? I believe the ordinary bug is one of the most prolific sources of tubercular infection.

Dr. Johnston of Hartford: In referring to sources of infection, bacteriologists inform us that the mouth in most individuals is more prolific in the production of the pathological bacteria than any other site. If we take this as our stand now, we may probably find a very prolific source of infection in the mouth. Our dentists tell us to use the toothbrush and rub the gums thoroughly, and as the gums are spongy, they bleed. Take the mouth with all these bacteria and use your new toothbrush several times, producing bristly punctures in the gums, and you have the most prolific source of infection imaginable. You cannot sterilize or boil a toothbrush without destroying it. In the near future you will find you will have to clean the mouth and teeth in accordance with the standards of civilization, and the toothbrush will have to go.

Dr. Johnston: In closing the discussion I only want to bring out a little stronger one fact in connection with the treatment by the Roentgen ray. I called attention to the fact that the throat was a frequent source of infection, and it is my custom to examine the throat in each case to the best of my ability. If I discover anything that appears pathological, I refer the patient to a competent man to attend to it. I believe, however, that many of these cases suffer from small tuberculous foci in one of the apices. We cannot remove a focus of infection in the apex either by surgery or metallic cataphoresis; we may be able to do so later. The X-ray, however, will reach a focus in the apex of the lung, and if applied there properly it exercises a curative effect on such focus. It also sterilizes, so to speak, every gland in the cervical chain. It treats not only those glands which are palpably affected, but also those which are not visibly infected, being as yet unrecognizable by any method of examination.

TREATMENT OF EPITHELIOMA BY THE X-RAY.*

BY DR. J. N. SCOTT, KANSAS CITY, MO.

In reports of the treatment of epithelioma there has been a wide difference in the technic employed. At the present time there is not so much difference as there was a few years ago. The principal difference at the present time is in regard to the frequency of exposure. It is generally agreed that it is always advisable to use a low-vacuum tube and the exposures every day, every other day, or at longer intervals, and they should be of such length of time as to produce some dermatitis, but not necrosis of the healthy tissues.

In the treatment of epithelioma, as they are nearly all located in parts of the body which are uncovered, it is very important not to break down healthy tissues because of the bad cosmetic effect due to the scarring. It is generally conceded that the cosmetic effect produced by the proper treatment with the ray is better than can be obtained by any other method, because the normal tissues are stimulated to grow and heal in instead of scar tissues being formed.

There has been a great diversity of opinion on the time that should elapse between treatments. Good results have been reported in cases which received only a few treatments with long intervals between, also in cases which were treated every day.

I have treated a series of twenty-two cases of epithelioma of the face, none of which was very large. Twelve were treated every day for periods varying from three to fifteen weeks; nine are apparently cured, two improved, and one, a cancer of the lip, was a complete failure. Six were treated every other day for from five to twenty weeks; four are apparently well, two improved, and one failure. Four were treated every third or fourth day from four to twenty weeks; two were apparently cured, one was treated every fourth day for fourteen weeks and improved for a while, but started to grow again and was put on daily treatment for four weeks and has been apparently well for six months. The other un-

* Read before the Fifteenth Annual Meeting of the American Electro-Therapeutic Association at the New York Academy of Medicine, September 21, 1905.

favorable case was treated every third day for twenty weeks; it was a recurrent epithelioma of the lip. The indurated parts became less in size, but would not disappear; they were then removed by a surgeon. The wound healed rapidly and the patient is now, at the end of nine months, apparently well.

From my experience with these and other cases, I believe that the quickest and best results are obtained by giving treatments every day. I apply the ray to an area about fifty per cent. larger than the apparent involvement, unless it should have to include the eye or ear. If it should, and they are not involved in the growth, I cover them half of the time and expose them the rest. I of course have the patient keep the eye shut if it is applied over it.

I have never damaged the eye or ear and have treated a number of cases of epithelioma of the eyelids. The eye seems to have a resistance to the ray because it is so highly organized.

In treating an epithelioma I gradually increase the ray until I produce a scaling of the healthy skin, but I want new skin formed when the old scales off. If carried to this degree we obtain a powerful stimulant to the healthy tissues but a destruction of the malignant ones.



**BRIEF REPORT OF CASES TREATED BY HIGH
FREQUENCY CURRENT.**

BY E. GARD EDWARDS, M. S., M. D., LA JUNTA, COL.

In the treatment of following cases the current was supplied by a sixteen-plate static of thirty-three-inch plates, revolving at a speed of two hundred and forty revolutions per minute, and transmitted to a high frequency coil with vacuum electrode attachments. Treatments were of twenty minutes' duration, every other day; the electrode being applied directly to the affected part for fifteen minutes, followed by short sparks for five minutes, except in the case of uterine or ovarian disorders, where the vaginal electrode was placed in close contact with the part affected.

Epithelioma of Lower Lip: Patient age fifty-two. Duration two years. Had tried various methods including caustics. Thirty treatments. No return after two years. Slight scar.

Tibial Ulcer: Patient age twenty-seven. Ulcer, size of a quarter, over tibia, the sequence of a phlebitis following typhoid. Duration twelve years. An elastic stocking was the only treatment that had availed him in any way. Fourteen treatments. No reappearance after two years.

Eczema of Hand: Patient age forty. General health indicated the so-called uric acid diathesis. Patient stated that he had been treated on this line a number of times without lasting benefit, also by a thorough course of arsenic. Eleven treatments. Cured. No return after six months.

Metritis: Patient age twenty-four. Otherwise in good health. Gave history of a sudden onset of leucorrhea, probably gonorrheal, one year previous to consulting me. Symptoms classic of the disease, with moderate enlargement of womb, but no involvement of the ovaries. After a short preliminary treatment by packs and douches began high frequency. Twenty-four treatments. Uterus normal in size; free from pain. Same condition four months later.

Metritis, Prolapsus, Leucorrhea: Patient age thirty-four. History of six confinements. I had treated her in the usual routine aside from surgical proceedings. Twenty-seven treatments. Cured, except wears light pessary for the prolapsus. Condition same after five months.

Uterine Fibroid: Patient age forty-five. Had always enjoyed good health. Mother of two children, youngest age ten. Some months before consultation began to have severe uterine hemorrhages every two weeks, which she attributed to the menopause. Finally, failing strength brought her to consult a physician. Examination revealed a large intramural fibroid of posterior wall. Diagnosis confirmed by consultant. Had next period, after third treatment, lasting ten days. Next period after twelfth treatment, lasting seven days. Next period came on after twenty-second treatment and was of five days' duration. Then followed two periods of one week each, at intervals of three weeks. Exactly twenty-eight days later she had what appeared to be a perfectly normal period, and has since menstruated every four weeks with a very moderate flow. Went on a vacation to mountains without apparently disturbing her in any way. One year later, condition normal, as to menses, and fibroid evidently much smaller.

Hay Fever: Patient age twenty. Subject to yearly attacks. Nasal cavities normal aside from turgescence of the membrane. System otherwise normal except for constipation. Placed on a compound of phosphate of soda and lithia, and adrenalin, locally. Relief only so long as she used adrenalin freely. Eight treatments. Relief marked from the first. Had a very little trouble after discontinuing treatments but not enough to resort to the spray.

Herpes Zoster (Intercostal): Patient age sixty-seven. Neuritis following an attack of herpes with ulceration. Ten treatments. Complete relief.

Sciatica: Patient age forty-six. Always healthy. Duration of present attack, two months. Eighteen treatments. Complete relief.

Tuberculosis of Testicle: Patient age twenty-four. Tuberculosis of an advanced stage, a mitral murmur, nephritis, orchitis of left testicle with fistulous opening in scrotum. Thirty X-ray treatments were given without apparent benefit; two months later began high frequency treatments. Some improvement after six treatments, and after forty treatments the fistula had closed, and the swelling was very much reduced. Remained cured at time of his death, six months later.

Editorial.

RATIONAL THERAPEUTICS.

EMPIRICISM has been the bane of Medical Science, particularly so since diffusion of knowledge by scientific investigation has so often discovered the "reason why." The greater the scope of scientific knowledge the more general the demand for rational finding of causes for effects; which is well.

Painstaking pathological research has so enlightened the profession as to the causes and effects of diseased processes, that the disposition is constantly towards a rational therapeutics which shall intelligently cope with causes and put a stop to destructive processes early in the course of disease.

Along with the study of pathology, methods and means of diagnosis have become more certain, which places the physician in a position to act intelligently.

Along with the development of our science has grown in volume and extent the pharmacopœia of medical remedies, and their employment is unfortunately extensive with the younger members of the profession and the physicians who know no other recourse but to administer them. As men grow older, if intelligent, they abandon as useless one by one remedies as they find them useless, and after a few years are relying more on their common sense, and a few tried and true remedies—the best of the *materia medica*. They find themselves gradually drifting in proportion to their opportunities to the employment of the natural agents and measures—diet, sunlight, fresh air, exercise—and as they investigate further adopt one by one the scientific physical measures: massage, mechanical vibration, artificial light, cold, moist and dry heat, and, last but not least, therapeutic electricity. These appeal to the rational physician as rational measures and are adopted; and then, his work becomes enchanting and the future success of his professional career is assured.

That so many earnest workers at present fail to seek out and find the value pregnant in physical measures is to be deplored. For the educated layman soon learns the futility and discovers the inconsistency of the broadest use of medical remedies,

and the gap is constantly widening between the profession and the intelligent classes. Many, following sentimental and religious impulses are led away to the Christian scientist, while others follow one or another of the fads or fancies and finding themselves no worse or perchance better, drift away from those who with the employment of rational measures for relief, would benefit them and maintain the credit where it properly belongs.

Brilliant authorities in diagnosis and pathological research are rendered impotent in their efforts to relieve conditions they discover. The reason for this generally arises either from the fact that a simple inflammation exists which medication will not remove, or an infective process in which a germ is the prevailing cause to be removed. There are already means at our command with which in a large majority of cases removal of either of these conditions, when employed early, promptly restores normal conditions.

A recognition of the fact that *local stasis* is present wherever congestion exists and must, in all non-infected conditions, be promptly relieved, when recovery will be immediately instituted. This applies to all conditions arising from trauma, and congestions of the internal viscera. An agency is here indicated which produces active contraction with recurrent relaxation of tissues—an interrupted application, a *vis a tergo*. To meet this indication energetically the electro-static modalities are pre-eminently the best, particularly the static wave-current and static sparks. The other electric modalities—mechanical vibration, massage, applications of light, heat, and hydro-therapeutic measures—are also eminently energetic in effecting the removal of *local stasis*, but not nearly so capable of application nor so efficient as the electro-static modalities, which produce to a greater extent intense, widely diffused tissue and muscular contraction, and leave the tissues in a tonic and not a relaxed condition.

When infection is present in the ambulant conditions or in institutions the disease can be combated far better by physical agents than others. The use of the high-potential and high-frequency currents, light, extreme degrees of dry hot air, the X-ray, by preventing the development of new colonies in the tissues, the induction of internal fluorescence, and the applications of cold to relieve local heat and contractions in

septic and other inflammatory conditions of impaired metabolism and poor nutrition are eminently successful. Restoring as they do active elimination, and general cellular activity, adapts these same agents pre-eminently to the relief and prevention of adynamic conditions.

These measures are safe, rational, effective, and far-reaching in their therapeutic scope, and when recognized and scientifically employed by a united profession will restore the waning confidence in the profession and greatly lessen the suffering of humanity.

The physician who once becomes familiar with rational therapeutics will be always enthusiastic and devoted to his work, as the man who follows empiricism never can.

* * *

PHYSICAL THERAPEUTICS IN THE KENTUCKY SCHOOL OF MEDICINE.

ANOTHER medical college has added to its faculty a chair devoted to Physical Therapeutics. It includes in this course the subjects of Medical Electricity, Hydrotherapy, Massage, and Gymnastics, under the title of the Chair of Physiological Therapeutics. Dr. Curran Pope of Louisville, who has been so energetic and influential in the development of the advanced therapeutic measures, has been assigned to this chair. This well-deserved honor has fallen where it should; to the man who has by his own efforts and success as a pioneer brought the value of these agents to the attention of his confrères, who in turn have acted wisely. The Kentucky Medical School stands out before the profession as another pioneer where others must follow. The New York Homeopathic Medical School added the course to its curriculum some time since, the Dean of the Faculty, Dr. Wm. Harvey King, occupying that chair.

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ERRATA.—In the article of Dr. J. H. Burch on the Treatment of Pulmonary Tuberculosis, on p. 728, December, 1905, issue, the words "uric acid," occurring in the thirteenth and eighteenth lines, should have read "puric acid."

Progress in Physical Therapeutics.

GYNECOLOGY AND METALLIC ELECTROLYSIS.

EDITED BY G. BETTON MASSEY, M. D.

Value of Vacuum Tube Currents in Gynecology.

Reference was made to the possible value of high-frequency and vacuum-tube currents in the minor, yet distressing complaints of woman in our contribution to this department for November while discussing a similar use of magneto-induction currents. A letter just received from Dr. A. Beil of Selby, S. D., alludes to our suggestion that the former current should be tried, and he forwards notes of the interesting case given below. Apropos of this subject, it should be stated that Dr. Snow has an excellent chapter on high-frequency and vacuum-tube currents in gynecology in his recent work, "Currents of High Potential."

Dr. Beil's case is related as follows:

"Mrs. B., aged thirty, three children. Came under my treatment seven years ago, suffering from prolapsus uteri and endometritis. The patient being obliged to work hard all the time, only very ordinary results were derived from pessaries, medication, and tampons, until 1903; then the lack of success in this and similar cases directed my attention to a study of electro-therapeutics.

"The endometritis and subinvolution were treated by a course of intra-uterine galvanic application, zinc-mercury being used last. Bipolar vaginal induced currents were used generally after the other treatments and in between times. Retroversion was partially relieved and the dysmenorrhea almost wholly, and other ailments, so far as to enable her to do her work without losing a day. But one condition remains in spite of all treatment: This is an ovarian pain, possibly due to faulty or diseased ovulation; it appears regularly every four weeks and exactly two weeks after menstruation has begun. It begins suddenly, cutting, grinding, tearing pains beginning in the ovaries, pressing towards the pubes; it doubles her up and simulates gall-stone colic in its intensity. (Morphine and opium have to be used in large doses and *these* are not satisfactory; therefore, have been used but a few times in seven years.) These pains may last twelve hours if not treated, then gradually grow less, but leave the most exquisite soreness of the abdomen for several days. This condition began fourteen

years ago after birth of first child, with a gradual increase in severity from a few sharp twinges to present paroxysms.

"For this I tried all forms of static treatment, a month each modality. Then I connected a Piffard transformer to the machine and tried high-frequency sparks two months with but a trifling amelioration. Then followed a treatment with direct and induced currents for the cure of the uterine conditions; also without effect on the pains, but the battery (carried to the bedside when the pains set in, and a bipolar electrode inserted in circuit with 1500 yards No. 36 wire, actuated by 6 cells and giving the most rapid interruptions possible) enables her to straighten out in ten minutes, and thirty to forty minutes more of the same current will leave her free from pain and with little soreness of the abdomen next day. Yet treatment during the month intervening is of no use.

"However, one evening the patient felt that the pains were coming on and managed to get to the office for treatment, just when the battery was out of order. So I connected the Piffard transformer to the static machine, and having shortly before received some vacuum tubes, I connected one to the positive discharging rod and inserted it against the most painful ovary with a spark-gap of 1 inch. Five minutes of this gave relief. The light in the tube appeared to be greenish yellow. In a spirit of investigation I interrupted the séance to see what the lasting qualities would be; in a few minutes pains began again, and I changed to another tube giving a blue light. But in spite of ten minutes' current the pains kept getting worse. I now changed back to the yellow-light tube, and relief was marked in a few minutes, twenty minutes' treatment overcoming all pain, and the patient was able to walk home without soreness. This opens up a whole line of theories as to the degree of vacuum in these tubes and their therapeutic significance. I will not go into this, but I keep the high tubes for deep action and painful conditions and the blue-light or low tubes for superficial and germicidal action, and have had a fair percentage of success.

"Dr. Titus' paper on the action of the X-Ray on Enzymes strongly suggests the use of the X-ray on this case, but so far I have not the patient's consent, for pregnancy relieves these pains entirely and the vacuum-tube treatment was a happy accident. A second opportunity to test the effect has not presented itself, so that 'bipolar faradism' is still the temporary expedient. Heat being very grateful to the patient (the tube generates heat close to where it is needed), she has herself suggested the use of a positive constant-current pad over the ovaries; but calls are always too urgent and sudden to take a 30-cell constant-current battery to the house and connect and prepare it for work, but I would like to try it."

G. B. M.

CURRENTS OF HIGH FREQUENCY AND HIGH POTENTIAL.

EDITED BY WALTER H. WHITE, M. D.

Some Recent Observations upon the Action and Therapeutic Value of Currents of High Frequency and High Potential. By Curran Pope, M. D., Louisville, Ky., The Lancet-Clinic.

"Most physicians are aware that the electric force or current produced from an induction coil or the rapidly revolving plates of a static machine is one of great intensity, with an exceedingly high electromotive force or voltage, but that it has small volume or amperage. This is greatly increased when the current is 'transformed or stepped up.' This process of transformation or stepping up is brought about by causing the current to pass through a coil of coarse wire, inducing a current of higher frequency in a secondary coil. Too frequently the medical and lay mind associate danger with the question of voltage, but voltage without amperage produces a current freed from all the dangers associated by the lay mind with currents of high voltage. In this 'step-up transformation' the current induced in the secondary coil is one of great current alternation. The primary sources of energy from which the high-frequency current may be obtained are as follows: (1) The static machine; (2) the induction coil; (3) the commercial alternating current; (4) the Tesla coil.

"Of these sources of primary energy, physicians need only consider the first two, the static and coil. It does not matter whether the primary sources of energy are taken from the coil or static machine, for in its transformation the primary energy is so changed from either of them that it is practically the same current delivered to the patient. From a practical standpoint a therapeutic apparatus is placed in the hands of X-ray and static workers that will add very materially to their resources.

"In its application special electrodes have been designed with a view to administering the current. These are practically of two kinds, one of them a section of glass tubing lined with tinfoil and attached to an insulated or vulcanite handle, with a proper connection for the conducting cord; the other is the well-known low-vacuum electrode so shaped as to be adapted in its application to external or internal surfaces of the body. Starting the machine in action, an electrode is connected with one of the terminals of the secondary coil and brought near the surface it is desired to influence; when the electrode is near enough to the surface a spark jumps from the electrode and impinges upon the body. . . . The application of this current is painless, provided the tissues covering bony structures are not too thin; for example, it produces a

slight discomfort when applied to the forehead, but none when applied to an extremity. This, of course, is speaking in general terms, and the high frequency does not vary in this respect from the well-known action of other currents, namely, increasing the area diminishes sensation, restricting the area increases it; a practical example of which is, if we grasp the tube with the entire hand no pain results, but applied to a single finger tip, the stronger and denser action gives some little pain.

"The physiological action of currents of high frequency is marked, and where it is properly applied productive of excellent results. It may be here stated that though this current is painless, it is not altogether harmless on that account. Bordier and LeCompte, in a report to the Académie des Sciences, of Paris, found by experiments that currents of high frequency, even though painless when applied to human beings, may destroy the life of small animals. When applied to animals by means of metallic collars, one about the abdomen, the other about the throat, paralysis and death followed a few days later, but when electrodes were applied, one in the mouth and the other in the rectum, death occurred in a few minutes, a rabbit being killed in fifteen minutes, a guinea-pig in seven, and a rat in forty seconds. D'Arsonval observed similar effects.

"The oscillations, as a rule, are of such frequency as to produce no impression upon the motor and sensory nerves, although I have observed muscular contractions when the electrode is quickly and promptly brought in contact with motor points. Its influence over the circulation is noticeable, and an intense vascularization of the skin takes place during the time of application. This is true in localized application as well as in the general systemic effects, to be mentioned later, where the solenoid is used. These currents thus produce active fluxion of the blood to the skin, and unquestionably favor oxidation and metabolism in all its different forms and phases, as is shown by increased elimination of waste products. Its action upon lowly organized bodies, such as micro-organisms, is peculiar and striking, and it is principally in this direction that the observations to be mentioned have been made. . . ."

The writer reports ten cases treated and cured by high-frequency currents, including cases of felons, boils, acne vulgaris, eczema, superficial ulcers, ulcerative or suppurative conditions, and affections of the skin.

"The action of the current in these cases and the results obtained are, in my opinion, due to three causes; First, the electrical bombardment or percussion, stimulating the skin and its nervous mechanism; second, to the active circulation produced at the point of application; and third, to the presence of the violet rays."

Dr. Pope ignores the Tesla coil, of which there are some high-frequency machines made of a modified Tesla type, which

are most satisfactory, exceedingly high potential, and not taking so much amperage for the primary current—often 10 to 25 amps. Those I have in mind use 5 to 6 amperes, giving any amount of milliamperes to 150 or 175. Usually 50 ma. through vacuum tubes is sufficient as measured by hot-wire meter.

W. H. W.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

Action of Radium Rays on Various Tissues and Organs.
Jour. A. M. A., October 21, 1905. By Thies.

He found that the action of radium was by no means always destructive, but that under certain conditions cell multiplication becomes more lively. The cells of the epidermis proliferate, giving rise to an appearance resembling that observed in chancroids of the skin. The tests were made on tissues and organs of guinea pigs, mice and scraps of skin from his own arm. The vessels proved exceptionally susceptible to the action of radium rays, and this explained their efficacy in curing angioma. Two large angiomata on a child were exposed for an hour to the action of ten mg. of radium. In the course of two weeks a flat scab formed over the exposed parts, and it was thrown off six days later. By the sixth week after the exposure, the vessels were no longer visible. In the place of the scab there was merely a patch of apparently normal skin, a little lighter in color than its surrounding tissues, but this difference was scarcely perceptible after six months.

In another case, the protuberant angioma was exposed for an hour and a half. By the sixth week an insignificant scar was all that was left of the former disfigurement!

No spermatozoa were found in the testicles and epididymis of guinea pigs after the radium had been fastened on the testicle for 24 hours. All the various tissues exposed reacted in some way to the radium rays, the reaction of the adenoid tissues and bone marrow being most pronounced. The lymphocytes vanished almost entirely from the blood, as likewise did the polynuclear leucocytes. The epithelium was next in order for susceptibility.

The epithelial cells are completely destroyed, as a rule, but when certain substances are interposed, the cells are stimulated to redoubled proliferation.

Action of Roentgen, Radium, and Ultra Violet Rays on the Blood. Jour. A. M. A., October 21, 1905.

Linzer and Helber conclude from their experimental studies that radium and ultra violet rays have no appreciable influence

on the blood, but that the Roentgen rays have an elective destructive action on white corpuscles. This action is most pronounced in the circulating blood. The lymphocytes are the least resistant to the Roentgen rays. A leucotoxin is generated by the destruction of white corpuscles, and injection of this leucotoxin into the circulation of other animals has a destructive action on the circulating leucocytes. The leucotoxin produced in the blood, after exposure to the Roentgen rays, induces an immunity to the leucotoxin in time.

X-Ray Treatment Skin Cancer, Lupus, and Keratosis. By J. M. Martin, M. D., Texas State Journal of Medicine.

In this interesting article the writer reports six cases of epithelioma of the lip and face generally. The cases are well displayed by photographs taken before, during, and after treatment. There is nothing new in the theories set forth in the paper. He insists that all necrotic tissue be removed before treatment with the curette or scissors, and that the cavities or ulcerated surfaces be thoroughly washed with a hot bichloride solution and all cavities drained and washed out with peroxide of hydrogen. He calls attention to the auto-infection following the destruction of large areas of malignant tissue. The success in three very severe cases reflects credit for the remarkable results obtained. A case of lupus made a good recovery and a case of keratosis has also done well.

The Adjustment of X-Radiations for Various Physiological Effects. By Dr. Russell M. Boggs. The St. Louis Medical Review, November 11, 1905.

All important points in X-ray therapy are touched upon in this paper. First the vacuum of the tube is given consideration. He makes it clear that a tube with a haphazard vacuum is no more liable to do good work than haphazard medicine. The relation between the volume, penetration, and resistance is discussed and their correlation pointed out, and he gives his theories succinctly for his use at the present time of five different rays, all varying from each other in therapeutic value. I can do no better than to quote liberally from his paper in demonstrating the use of these five different rays.

"No. 1, the tube being so low that the cathode stream can be plainly seen, and this tube will not fluoresce beyond six or eight inches. No. 2, with the cathode stream scarcely visible, but there is a bluish areola around the cathode. No. 3 is a tube which does not show any of the cathode stream and will back up between one-half and one and one-half inch parallel spark-gap, and with two milliamperes going through the tube and a small spark-gap at each side, will penetrate the chest of a

patient weighing from 120 to 125 pounds and shows the ribs very black. If 10 or 15 milliamperes pass through the same tube, an excellent picture will be made. No. 4 is a tube which will pass one-half milliampere of current, and the light will penetrate a patient's chest of almost any size, but the bones will appear a grayish white on a screen. No. 5 is a tube in which the light is very unsteady and the amount of current passing through the tube is scarcely noticeable by the reading of the milliampere meter. There is little use for this tube in a laboratory, because the quantity of radiation given off is so very small, and the rays are too penetrating for most conditions. Tube No. 1 might be an acne tube, and is suitable for nearly all skin diseases which are not ulcerated. No. 2 for treatment of epithelioma and lupus. Tube No. 3 for treatment of cancer of the breast, tuberculous glands, etc. Tube No. 4 for the treatment of sarcoma."

In the first class of cases he wishes to apply a rich chemical light to the skin which will not penetrate to the muscles and subcutaneous tissue. He believes that a ray of this kind will leave a smoother skin and better after-results than when a higher tube is used.

The reason No. 3 is selected for the treatment of cancer and No. 4 for the treatment of sarcoma is explained by the fact that the tissues of the sarcoma are much more dense to the X-ray than those of the carcinoma. His equation is as follows: If it takes 100 units of X-ray to destroy normal tissue, it will take 50 per cent. of them to burn sarcoma, and about 25 per cent. to burn cancerous tissue. It is thus seen why the X-ray will destroy malignant tissue without injuring healthy tissue. He points out the fact that raying the lymphatic glands retards the progress of cancer and considers that the glands should be rayed uniformly before operative procedures. It is a well-known fact that when carcinoma of the breast invades the glands of the chest, the progress can be checked by the X-ray, but much more cannot be expected. He devotes considerable space to the discussion of distance and gives well-defined rules for adjusting the tube at various distances from the parts treated. His final conclusions are: (1) that selection of quality of radiation is necessary to produce the best results in radiotherapy; (2) that epithelial cells are destroyed by small doses, while the same volume of rays will stimulate connective tissue cells; and (3) that regulated tube distance is important in the treatment of both superficial and deep diseases.

Electro-Therapy in Epithelioma. By W. T. Parrott, M. D.,
The Charlotte Medical Journal.

This interesting contribution reports four successful cases of epithelioma treated by the X-ray and Minim light.

The X-Ray in Skin Diseases a "Passing Fad." W. I. Le Fevre, M. D., The Cleveland Medical Journal.

The doctor reports several cases of eczema all cured by means of the X-ray, no salves or lotions being used. Some of these patients have remained well for nearly two years, so that the results obtained may be said to be permanent. His results have been extremely gratifying and when circumstances permit, he always uses the X-ray in the treatment of this affection. The paper is illustrated by numerous photographs, which demonstrate the value of his work. He also reports a case of blastomycetic dermatitis, which had become of very large size, on the right shoulder of a patient, who had previously fallen from a box-car, bruising his shoulder, from which the disease originated; its spreading was arrested and eventually a complete cure was effected by means of the X-ray. He considers the X-ray as not a passing fad in the treatment of skin diseases, but that it has come to stay, and will increase in popularity in time to come.

RADIOGRAPHY.

EDITED BY HERMAN GRAD, M. D.

The X-Ray in the Treatment of Fractures. By Duncan Eve, M. D., Nashville, Tenn., Lancet-Clinic.

"To suggest that it is the surgeon's duty in all cases of fracture to employ the X-ray is perhaps making a statement too strong, yet it is our routine practice to use the method in all fractures in or about joints and in certain regions, such as the head and spine. Even in simple fractures, where complications are suspected, frequently much embarrassment is prevented by recourse early to the rays.

"With a correct diagnosis the principles of treatment of most fractures are reduced to a few points of simple common sense. In the great majority of cases more or less displacement follows every fracture, and as a cardinal principle of treatment, of course, the displaced fragment must be reduced to its normal position. After exact reduction has been accomplished, proper fixation is in order, which is done by immobilization of the part. Simple as this rule seems, yet it is frequently violated. The functional impairment following non-reduced fractures is nearly always caused by undue pressure of the bone fragment upon the soft parts, the consequences of which are manifest. . . .

"No surgeon could expect union of a bone if there was overlapping of the fractured ends. In order to accomplish exact reduction, the degree and the direction of the displacement as shown by the rays must be first considered and remedied. This can only be done with ease and safety at the very beginning of

treatment, and the only safe reliance is an X-ray apparatus. It may appear unjust to demand that every surgeon should supply himself with a Roentgen outfit on account of its great expense, but after all there is no other choice, for your patient will insist upon it. After the exact situation of the fragments are ascertained by the fluoroscope, the surgeon knows at once how to replace and reduce the same by manipulations or properly directed pressure.

"One of the latest and best authorities on this subject makes the following deductions in regard to the use of the X-ray:

"1. In all fractures in or about joints, either as a preliminary to the reduction of deformity or as evidence that such reduction has been accomplished, these fractures are, for unavoidable reasons, often followed by some limitation of motion and a more or less imperfect functional result. They have, therefore, on innumerable occasions been the basis for suits for malpractice. It will be both a satisfaction and a safeguard for the surgeon if he can see that his work has been accomplished properly, and can retain definite evidence of that fact.

"2. In doubtful cases or cases supposed to be of great rarity it will be of inestimable value, both as aiding diagnosis and as demonstrating and recording the conditions present.

"3. In cases of old injury in which, as so frequently happens, no reliable clinical history is obtainable and no accurate diagnosis can possibly be made by the ordinary methods.

"4. In cases of ununited fracture, both to show the exact position and relation of the fragments prior to operation, the presence or absence of interposing structures, and also to show after operation the degree of efficiency of the wire, or of the peg, or screw, or of the splint, or other retaining apparatus. We may frequently determine in such cases whether or not open operation is needed, union often being obtainable, when the fragments can be brought into good position and nothing is interposed by mere friction and the reapplication of the splint or other dressing.

"When there is much swelling and only slight displacement, even where an anesthetic is given, it is often impossible to detect fracture without the aid of the rays. The Roentgen method also enables us to determine not only the nature of the injury, but absolutely the amount of comminution, deformity, and impaction. It further acquaints us with the fact of the direction of the line of fracture and whether or not the fragments are in contact, the presence of an ununited fracture, in determining epiphyseal separation, and the question of the mechanical support holding the bone or bones in apposition, even when the limb is clothed or wrapped in dressings.

"At present the X-rays are of more assistance in the investigation of the pathology of fractures than in the treatment, and the more precise our knowledge of the pathology, the

more satisfactory the treatment. Further, the exact diagnosis of fractures of certain bones without an X-ray examination is always open to doubt.

"In fractures of the skull, both or either table of the vault may be recognized. While it is with difficulty, yet fractures at the base of the skull can be diagnosed—in fact, an expert can usually determine the line of fracture in the anterior, middle, or posterior fossa. Fractures of the spine never show well in the dorsal and lumbar regions, but skiagraphs are made that sometimes subserve good purposes. White suggests, to take a picture of a fractured rib, first limit chest motion by bandaging. Fractures in the shoulder-joints are often impossible to diagnose without the X-ray, particularly where there is much swelling. When even separation now of the tuberosities of the humerus occurs, we can with the greatest assurance determine the same by a short and quick examination with the X-ray. Even in fractures of the shaft and all other long bones we gain valuable information by the use of the rays. In our opinion, fractures of the elbow-joint, especially in children, were never treated very satisfactorily before the introduction of the X-ray. I never attempt to diagnose one without its use. I would further state that I am never satisfied after the dressing until a re-examination assures me of a positive reduction. In children it is best to anesthetize before using the ray; the patient is then spared the painful ordeal of manipulations, and the unnecessary bruising and laceration from too much handling. I once heard a distinguished surgeon in an adjoining State make the assertion that his X-ray machine had paid him fully in the satisfaction with which he now treated elbow fractures. . . .

"Improvement in technique enables us now to get a clear skiagraph of the upper part, including the head of the femur when fractured, with a portable X-ray apparatus without disturbing the patient or his dressings.

"In the foot, as in the wrist, the X-ray has been used with great success, especially where impaction has occurred and it is impossible to obtain crepitus or mobility on account of the swelling. . . .

"I cannot conclude without quoting from a well-known X-ray authority, who states that 'when the limits of error are kept clearly in mind, the actual value of the discovery of Roentgen to surgical science is immense. When there is doubt of the diagnosis of a fracture, no physician has done his full duty by his patient if he can command skiagraphic examination and has not used it.'"

DIETETICS.

EDITED BY SIGISMUND COHN, M. D.

Some Observations on the Effect of Certain Diet Cures in Diabetes Mellitus. By R. Julius Friedenwald, M. D., and John Ruhräh.

As the rational treatment for diabetes is only dietetic, the other remedies as water-cures, bathing resorts, drugs, etc., are only side issues. In diet alone we possess the actual remedy which fulfills the indication for treatment, viz., the maintenance of nutrition, the increase and the ability of the body to assimilate sugar and the avoidance of complications. The object of the paper is to bring forward certain diet cures which have assumed some importance for the past few years, to wit: (1) the milk cure, (2) the potato cure, and (3) the oatmeal cure.

The first to advise the milk cure was Rollo. He recommended its use in quantities of a liter a day. Winternitz, Strasser, and Kolisch are also in favor of the milk cure. Naunyn observed that diabetic patients react differently to milk-sugar, and that in each individual case at first a trial should be made. He also draws attention to the fact that the unfavorable effect of milk can sometimes only be detected after a lengthy and continuous use of the milk cure. According to von Noorden the milk cure should not be used in mild cases of diabetes. He is also against the use of a strict milk diet in all cases of diabetes and he advises varying the milk with kefir, buttermilk, kumyss, and cream. He also recommends the co-called diabetic milk of Gartner, which only contains one per cent. of milk-sugar. The observations of the writers with the milk cure are in accordance with von Noorden. They do not find it advisable to use an exclusive milk diet except in severe cases in which diabetic acid is present in the urine, or when diabetic coma is threatening.

The potato cure has first been advised by Mosso. As potatoes contain from 16 to 22 per cent. of starch while wheat bread contains about 60 per cent., he replaced 500 grams of wheat bread by 1500 grams of potatoes. He found a marked diminution of glycosuria and polyuria while the patient was taking the potato cure. He also observed a certain degree of tolerance for wheat bread after the patient had finished the potato cure. He attributes the beneficial effect of the diet to the large proportion of water and potassium salts contained in the potatoes. Of 23 diabetic patients treated by this method in only one case was the advantage in favor of the bread. Offer and von Noorden have confirmed the observations of Mosso, but, as in the milk cure, von Noorden prefers to replace only a certain portion of the bread by potatoes. The advantage of the potato cure is that it can be consumed with large quantities

of butter, and this is of great importance. The authors followed the method suggested by von Noorden, replacing only a portion of the bread by this form of food and in a considerable number of cases have seen a very beneficial result. An additional advantage of the potato is that it can be prepared in various ways, viz., baked, boiled, fried, mashed, etc.

The Oatmeal Cure.—Von Noorden was the first who pointed out that certain patients suffering from diabetes in spite of a strict diet continued to eliminate sugar, but could quickly and permanently be relieved of this condition by a diet of large quantities of oatmeal. The beneficial results were, however, only obtained when the oatmeal represented the largest portion of food consumed and when no other carbohydrates and no meats were taken. Therefore the oatmeal-cure can only be taken for a limited time—from one to two weeks. After the return to the usual diet after the oatmeal cure is finished, the tolerance for carbohydrates increases and the diacetic acid very frequently disappears. The authors come to the conclusion that the oatmeal cure is most useful in the form of diabetes exhibiting diacetic acid in the urine, but proves harmful in the mild cases of diabetes. On the other hand, each case of diabetes should be studied individually and daily examination of the urine should be made in order to determine whether the special case is being benefited by the treatment or not. In diabetic coma it is also to be preferred to the milk cure. The beneficial effect of the oatmeal seems to be due to some substances contained therein, especially the salts. The preparation of the oatmeal can be done in the following way: Any good oatmeal may be well cooked for a considerable length of time in water with an addition of a bit of salt. While cooking, butter or the white of an egg beaten and strained may be mixed with it as the oatmeal cools. The quantities to be taken daily are: oatmeal 250 grams, albumin 100 grams, and butter 300 grams. The meals are taken at two hours' intervals. In addition, wine, cognac, or black coffee is allowed. After a few days five to seven eggs, but no meat; and after one to two weeks a vegetable diet is interposed. The return to the ordinary diet must be made cautiously, lest the acetone bodies increase to an alarming degree.

In conclusion, the authors believe themselves to be justified in asserting that the milk cure, the potato cure, and the oatmeal cure are all valuable in the treatment of diabetes.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

Copious Water-Drinking and Excretion in Typhoid Fever.

Though the value of the ingestion by the patient of large quantities of water during many of the febrile diseases is a

recognized fact in therapeutics, it is a point insisted upon much less frequently than it deserves. This is due partially to the belief by many physicians that the wholesome effect of the water may possibly in part be overcome by its untoward influences. Studies recently made public (*American Journal of the Medical Sciences*), should go far toward correcting such ideas, at least in so far as typhoid-fever patients are concerned. Drs. E. F. Cushing and E. W. Clarke detail the clinical results in one hundred cases of typhoid fever in which the patients took as much as a gallon or a gallon and a half of water daily, resulting in a polyuria corresponding closely to the amount ingested. As compared with other cases not so treated, these patients were invariably more comfortable, and, of greater importance, the mortality seemed to be still further diminished when this method of hydrotherapy was employed as an accessory to the cold-bath treatment. While these clinical tests were in progress, Drs. Torald Sollmann and J. A. Hofmann investigated several features of the urine secretion as influenced by this artificially produced diuresis. They found that the eliminating capacity of the kidneys is not injured in typhoid fever nor by prolonged polyuria. No accumulation of fluid appears to occur in the body. Chlorid secretion varies directly with chlorid intake. There is a greater tendency to chlorid retention in typhoid fever, and this is greatly diminished by polyuria. The writers conclude further that a moderate nephritis does not break down the chlorid retention mechanism, since all the cases had albuminuria. These studies emphasize very strongly the value of large quantities of water in the treatment of typhoid-fever patients; there appear to be no untoward effects of the water *per se* to lessen the favorable action as a whole.

Blunders in Water Cures. By E. Bibergeil.

Winternitz remarks that mistakes are liable to occur in estimating the amount of stimulation from the thermic and mechanical stimuli applied, in the behavior afterward, and in guiding and controlling the reaction. In applying cold baths in fever their effect on the nerves, vessels, heart, blood, tissues, and intraorganic metabolism must be borne in mind. It is a mistake to apply very low temperatures, very slight mechanical stimuli, and only for a short period. Such applications raise the temperature instead of reducing it; the innervation, metabolism, and oxidations are whipped up instead of being checked. Long, cool, not cold baths, rather intensive mechanical stimuli, tranquil rest under adequate covering after such a bath, and its repetition at the proper time, are the necessary factors. By paying attention to the temperature alone, the physician is apt to err by too frequent and too cold baths in the severe infectious diseases. Winternitz has seen cases in

which serious nervous disturbances were the result of this error (*febris nervosa, versatilis* in the aged). Longer intervals, slightly warmer water, and longer baths generally banish these frequently threatening complications. In typhoid a very dicrotic and rapid pulse is more important as an indication for repeating the baths than a high temperature. Very rapid pulse with still vigorous heart calls for wet packs, repeatedly changed, which in case of a slow pulse and signs of weakness on the part of the heart would be a serious blunder. The behavior of the vessels is the guide for the choice of the temperature, and for the length and degree of the mechanical stimulation. When the vessels display a paralytic tendency, as in severe scarlet fever, the most energetic thermic stimulation is demanded, with avoidance of much mechanical stimulation of the skin. Brief dips and douches of quite cold water are often surprisingly effectual. In measles the indications are for powerful mechanical with only slight thermic stimulation. Rubbing down with a fine linen cloth wrung out of quite cold water responds to the indications in measles. The delayed eruption frequently appears at once after this procedure, and threatening symptoms vanish. The most prominent signs of collapse and heart weakness are the high temperature in the mouth and rectum (with clammy extremities, etc.). This condition calls at once for application of heat to the periphery and abstraction of heat from the trunk. Cold packs to the trunk and heat to the extremities have saved many a patient who would have been irremediably lost without such energetic and persevering applications. The water applied to the trunk should be as cold as possible and that applied to the periphery should be as hot as possible. In anemia, in chlorosis, and in convalescence the error is in using too hot or tepid temperatures, forgetting that the aim is to stimulate function. Vigorous, brief, thermic and mechanical stimulation of the nerves, following a preliminary thorough warming—these are the principles for such cases. In taking a sitz bath, the unimmersed parts of the body must be carefully covered to prevent loss of heat. Otherwise the effect of the bath is entirely annulled in treating intestinal affections. Usually in hydrotherapy the cold should follow hot applications, never the reverse. The physiologic action of hydrotherapeutic measures should be better studied, and a well-conducted clinic for hydriatic treatment is a necessity, he thinks, in every medical school.

The Influence of Local Applications of Cold upon the Heart.

Krebs (Berl. klin. Wochenschr., April 28, 1904) finds that in many cases in which weakness, either nervous or organic, is present, the local application of cold acts favorably, resulting in improved quality and regularity of pulse by elevation of arterial pressure. The best results are obtained when the ap-

paratus for the local applications of cold is used in conjunction with strict repose on the part of the patient. In other cases than those above mentioned there is no objective result beyond an influence of a psychic sort. The results obtained by this treatment cannot be compared with those due to the action of digitalis.

Digestive Affections and Balneology. By C. A. Ewald, M. D.,
Berliner klinische Wochenschrift.

Ewald's article was read as an address at the recent German Congress of Balneology. He reviews the action of the various mineral waters on the digestive apparatus, remarking that dogs with a Pawlow fistula would be useful subjects for study of the action of mineral waters. He advises against any relaxation of strict dietetic regulations. The patients are usually those who "live too well" all the year around, and need the traditional restrictions accompanying the water course. He classifies the indications for the employment of the various groups of mineral water, adding that empiricism speaks the last and decisive word in the matter. A personal knowledge of the spas is a great advantage for the physician. The annual "medical study trips" have proved very valuable institutions for this purpose in Germany and France.

THERMOTHERAPY.

EDITED BY DAVID E. HOAG, M. D.

Rheumatism of Childhood.

Although we find no mention in the literature contra-indicating dry hot air in the diseases of children, still there are no well-authenticated instances, to the writer's knowledge, where its use has been urged as a special remedial measure.

The disease, however, that it is pre-eminently indicated in is rheumatism. The fact that this disease is more frequent and more serious in children than in adults is not always appreciated. The pathologists claim that although we may have diseases simulating rheumatism in children, we have no conclusive proof. Hence we should be wary in diagnosing it as such. Here is where many doctors err. We are free to admit there is nothing more commendable than extreme care in diagnosis and that it is important. At the same time we cannot afford, if we are at all conscientious, to let our patient develop a train of symptoms which may rapidly lead up to fastening upon the patient an afflicted life and an impaired usefulness:

all of this happening while we are looking for some tangible point on which to base our diagnosis. We should thus attempt to ward off in the early years these diseases, which later become chronic.

Rheumatism is a disease often overlooked in children. An eminent London practitioner has said, "Twenty-five per cent. of all cases in the children's hospitals suffer from rheumatism in one form or another."

This is a condition which will fix itself upon the minds of surgeons who see much cardiac disease in children. It should be the habit when called to see a child to question for growing pains. These so-called growing pains are often a manifestation of rheumatism.

There is probably no fact in clinical medicine more thoroughly proved than the relation between tonsilitis and rheumatism.

It is thought by some that the tonsils are the entrance-point for micro-organisms, clinical cases appearing in which tonsilitis precedes by a short time an attack of rheumatism. It cannot be positively stated that the rheumatic poison gets into the system through the tonsil. There is no denying some relationship, since we see so many attacks of rheumatism preceded by tonsilitis.

The question has arisen as to whether the rheumatic diathesis causes the tonsilitis, or whether rheumatism develops after tonsilitis. Tonsilitis, along with the arthritides and the heart diseases, is so closely associated in the professional mind with rheumatism, that the true nature is soon recognized, but there are several conditions which are closely allied to rheumatism and yet are not, as they should be, classed as rheumatic disease. Wry-neck, for instance, in children is almost invariably rheumatic in origin. Certain dermatoses such as erythema, eczema, and psoriasis are often associated with rheumatism. Chorea has been accepted for many years as closely associated with many of the phenomena of rheumatism. We have attempted to show in this category many reasons for such rheumatic treatment in diseases of children. Whether the treatment shall be medicinal or non-medicinal, or a combination of both, is to be decided by the experience of the practitioner. The various drug treatments which suggest themselves in these cases have all the objection of so disordering the youthful

stomach as to be objectionable. If we can realize that nearly all of the above class of cases come under the head of nutritional disorders, then we shall quite recognize the importance of elimination through the natural channels—breath, skin, bowels, and kidneys. The application of dry hot air is both safe, simple, rational, and easy of accomplishment.

PSYCHO-THERAPY.

EDITED BY LESLIE MEACHAM, M. D.

Suggestive Therapeutics. By B. A. Bobb, M. D., Mitchell, S. D., *The Medical Age.*

The author of this excellent paper wastes half of his space by a résumé of the long-discredited theory of Hudson. It is a pity that practitioners of psychotherapy will not read a standard book on psychology, and avoid uttering nonsense about mental processes.

"The necessary suggestions may be given by different methods, but I have found a combination of them all to be more effectual usually, as suggesting orally, expressions of countenance, touch, etc. . . . In regard to the diseases that are amenable to treatment by this method, I might say, generally speaking, all functional diseases are perfectly controllable. There is no disease that I would say it is impossible to cure, and still we might sometimes fail to cure the simplest malady. . . . I believe that there is nothing like it to produce quiet sleep and break up the wakeful habits of nervous people. Chronic constipation will yield to this treatment more quickly and with better results than to any treatment of which I know. I have had long-standing cases of menstrual difficulties, such as dysmenorrhea, irregularity, etc., yield within a short time to this treatment. . . . Show me the physician who does not offer helpful suggestions with every prescription that he gives for an internal malady, and I will show you a physician who is not nearly as successful as he might be. If the patient is properly prepared as to the effects of the remedy, every dose of it that he takes he thinks of what was told him that it would do. Thought takes the form of action, and the thoughts of the effect of that medicine will go as far toward that effect as the remedy itself. . . . We may not be successful with every case, and I am certain that we are not with the use of medicine alone. I am not in the least opposed to the use of medicine. I believe in it as much as ever, but there are classes of patients that medicines do not reach, which I am sure can be cured in the manner I have mentioned. . . . If we as physicians do not arouse ourselves to the necessity of this method of treat-

ment, and take it out of the hands of charlatans and the ignorant, they will certainly treat many of our cases. . . . There is not any particular power in ourselves, but the condition that we wish to produce lies within the patient, and it is simply our ability to produce 'rapport,' a peculiar state of sympathy. . . . Cases are cited of the alleged cure of dysmenorrhea, insomnia, and tonsilitis by suggestion.

Professor Angell, in "The World To-day," says: "Mesmerists, hypnotists, Christian scientists, faith-curists, mental healers, medicine men, and priests, one and all succeed by playing upon the imagination in producing remarkable changes in bodily health. Moreover, so far as the evidence is available, the more intelligent employment of such agencies displays astonishing uniformity in the results achieved. Essentially the same disorders show themselves amenable to alleviation under the auspices of Christian science as under hypnotic treatment; and about the same percentage of such disorders fail to yield to treatment under the two forms of procedure." He then proceeds to give a list of the functional conditions benefited, and shows the absurdity of attempting to combat germ diseases by such measures.

FOREIGN ABSTRACTS.

EDITED BY AMÉDÉE GRANGER, M. D.

Indications for Radiotherapy. Dr. Haret.

"Although the therapeutic action of a drug in disease cannot necessarily be determined by its action in health, it is more logical before stating what their indications are, that we should consider briefly the action of the X-rays upon healthy persons and mammals."

The action of the X-rays upon the skin and the subjacent tissues was the first observed and is of the greatest importance. All degrees of reaction from the mildest dermatitis to the severest burn have been produced. In each instance the process follows a regular course which can be divided into four periods, calm, rise, acme, and return to normal. As a rule the shorter the period of calm (from the X-ray exposure to the time of appearance of the symptoms) the more severe the other two, and the more protracted the last.

Histological study of the lesions has shown, 1, that in severe X-ray burns the nerves, vessels, and the cellular elements are altered; 2, that the epithelial cells are primarily affected, and in very mild cases they alone are altered; 3, that the vessels are altered next; 4, that all epithelial cells are not equally affected, the rays having a selective action upon certain cell elements.

It has been determined that the rays bring about destruction of the cells of the retina, and atrophy of the optic nerve.

A dose of rays not sufficient to produce reaction of the skin caused sterility in guinea pigs without loss of sexual appetite. The seminal fluid showed at first inert spermatozoa, later none were visible.

Severe raying of the ovaries produces atrophy and necrosis of the Graffian follicles.

The action of the Roentgen rays upon the blood-forming organs is very marked, especially so upon the spleen. The spleen is more susceptible than the skin. To affect the bone marrow a larger dose is necessary, and the changes only become apparent several days after the raying.

The X-rays also have a bactericidal action.

They are indicated in a large number of skin diseases because of their depilatory, counter-irritant and bactericidal action.

In leucemia, and other diseases of the lymph and blood glands, they have been used lately with excellent results, and in simple goiter.

A third large class of cases in which they are extensively employed is malignancy. The author believes them a specific in all epitheliomas whether of skin or mucus membrane. In other growths, especially those which are deep-seated, when operable, he advises ablation followed by careful and prolonged raying. When inoperable and ulcerated he considers that the X-ray is the only treatment which offers a possibility of cure and a certainty of some degree of improvement or palliation. (Read before the First International Congress of Physiotherapy, Liège, 1905.)

BOOK REVIEWS.

PRACTICAL MASSAGE IN TWENTY LESSONS.—By HARTWIG MISSEN, Instructor and Lecturer in Massage and Gymnastics at Harvard University Summer School; Director of Physical Training, Brookline Public Schools, etc., with 46 Original Illustrations. Philadelphia, F. A. Davis Company, Publishers, 1905.

This work treats of massage as taught by the author at Harvard University Summer School. This work is eclectic in form, in that it represents a combination of manipulations and movements from other systems as well as the author's original ideas.

The first lesson includes a short history of massage with directions relative to the varieties of movements, duration, and frequency of treatment, and the physiological effects of movements,—passive, active, and resistive. The remaining lessons refer to movements in general, followed by directions as to special movements in treatment of the upper limbs, lower

limbs, chest, abdomen, and trunk. Prescriptions are given in respect to the administration of general massage. Massage of the various parts of the body, with full illustrations as to administration, is considered. Nine of the lessons refer to the treatment of various pathological conditions including nervous diseases, as of the brain and spinal cord, nervous hysteria, chorea, sciatica, the occupation neuroses, diseases of the organs of circulation, diseases of the organs of digestion, and what the author considers as diseases of the organs of movement. Scoliosis, rheumatism, lumbago, stiffness of the joint and tendons, sprains, have a place in the work.

The book is well illustrated and the author shows his aptitude for the presentation of his subject in a concise manner. It is an excellent work for the beginner, to be used as a foundation preliminary to the perusal of a more elaborate treatise of the subject.

NEUROTIC DISORDERS OF CHILDHOOD, including a Study of Auto- and Intestinal-Intoxications, Chronic Anæmia, Fever, Eclampsia, Epilepsy, Migraine, Chorea, Hysteria, Asthma, etc. By B. K. RACHFORD, M. D., Professor of Diseases of Children, Medical College of Ohio, University of Cincinnati. Pediatricist to the Cincinnati, Good Samaritan, and Jewish Hospitals. Member of American Pediatric Society, Association of American Physicians, etc. New York: E. B. Treat and Company, 241-243 West 23d Street, 1905. Price \$2.75 net.

This work considers affections of childhood that are often overlooked by the general practitioner. The work is well written and the subjects presented with care. The Normal Functions of Nerve Cells, the Physiological Peculiarities of the Nervous System During Infancy and Childhood and the Physiological Factors of the High Fevers and the Variable Temperatures of Childhood, etc., are considered. These subjects are treated in an able manner and the volume is a valuable addition to the library of the practitioner. The author has not fully recognized the importance of the employment of physical measures in the treatment of many conditions such as enuresis, migraine, recurrent vomiting, epilepsy, hysteria, habit spasm, etc. The work is attractively bound and highly creditable to both the publishers and the authors.

A MANUAL OF CLINICAL CHEMISTRY, MICROSCOPY, AND BACTERIOLOGY. By Dr. N. KLOPSTOCK and Dr. A. KOWARSKY, of Berlin. Translated by THEW WRIGHT, M. D. London: Rebman, Limited, 129 Shaftesbury Avenue, W. C.; New York: Rebman Company, 1123 Broadway, 1905.

This manual is a presentation of the subjects represented in its title compiled in a concise form. It is a work designed for the general practitioner, giving the essential and practical features of the subjects in a way in which topics can be readily found. The work is well written and classified and the authors are to be congratulated on their work, especially on their arrangement. The leaded headings will be of great assistance

to the busy practitioner. The work includes a bacteriological examination of the secretions and deposits in the mouth and pharynx, of nasal secretions, of conjunctival secretions, of diseases of the skin, examination of the sputum, of the gastric contents, of the feces, of the urine, of the urethral and prostatic secretions, and fluids obtained by puncture. The usual method of bacteriological examination, formulæ of stains and culture media, receive considerable attention in the last chapter. Besides a number of cuts, the work contains sixteen colored plates. It is one of the most concise and practical manuals on clinical chemistry, microscopy, and bacteriology that has been produced.

PROGRESSIVE MEDICINE. A Quarterly Digest of Advances, Discoveries, and Improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARE, M.D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College, Philadelphia; assisted by H. K. M. LANDIS, M. D., Assistant Physician to the Out-Patient Medical Department of the Jefferson Medical College Hospital. Philadelphia and New York: Lea Brothers & Co., July 1, 1905. Price \$6 per annum.

The present number of this valuable quarterly contains interesting articles on Hernia, by Wm. B. Coley, M. D.; Surgery of the Abdomen, Exclusive of Hernia, by Edward Milton Foote, M. D.; Gynecology, by John G. Clark, M. D.; Diseases of the Blood, Diathetic and Metabolic Diseases, Diseases of the Spleen, Thyroid Gland, and Lymphatic System, by Alfred Stengel, M. D.; and Ophthalmology, by Edward Jackson, M. D. The cuts illustrating the subjects are particularly good. The subjects as a rule are exhaustively treated, but at the present time greater recognition might have been given to physical measures, as in the use of the X-ray, radium, hydrotherapy, and the uses of certain electric modalities. An exhaustive index completes the book. It is a publication well worthy of the patronage of the profession.

THE PHARMACOPŒIA OF THE UNITED STATES OF AMERICA.—Eighth Decennial Revision by Authority of the United States Pharmacopœial Convention held at Washington, A. D. 1900. Revised by the Committee of Revision and published by the Board of Trustees. Official from September 1, 1905. Philadelphia Agents: P. Blackiston's Son & Company. Sub-Agents: New York, E. R. Pelton, 19 East Sixteenth St.; Chicago, The E. H. Colgrove Co., 65 Randolph St.; St. Louis, C. V. Mosby, 2313 Washington Avenue; San Francisco, Payot, Upham & Co., 100 Battery Street.

The work opens with a historical introduction and an abstract of the proceedings of the National Convention of 1900 for revising the Pharmacopœia, introductory notices relating to various terms for the apothecary to follow, with a list of remedies added to the Pharmacopœia, and a list of remedies dismissed. Changes of official Latin titles and of official English titles have also been made. A comparative table showing the strength of the more important pharmaceutical drugs and preparations in the preceding and the present Pharmacopœia. The Pharmacopœia comprises about 510 pages. The work is

well written, closing with an appendix devoted to the following subjects: Tests, Reagents, Test Solutions, and Volumetric Solutions. An alphabetical list of Volumetric Assays, Gasometric Estimations, Alkaloidal Assays by Immiscible Solvents, Determination of the Optical Rotation of Organic Substances, and a list of the Elements and Principal Pharmacopoeial Chemicals and Various Tables are also included. The publishers are to be congratulated on the fine appearance and general quality of the workmanship.

A SYSTEM OF PHYSIOLOGIC THERAPEUTICS.—A Practical Exposition of the Methods other than Drug-giving, useful for the prevention of disease and in the treatment of the sick. Edited by SOLOMON SOLIS COHEN, A. M., M. D., Professor of Clinical Medicine in Jefferson Medical College; Physician to the Jefferson Medical College Hospital, and to the Philadelphia General, Jewish, and Rush Hospitals, etc. Volume XI. Serum Therapy, by Joseph McFarland, M. D., Professor of Pathology and Bacteriology in the Medico-Chirurgical College of Philadelphia. Organotherapy, by Oliver T. Osborne, M. A., M. D., Professor of Materia Medica and Therapeutics at Yale University. Radium, Thorium, and Radioactivity, by Samuel G. Tracy, B. Sc., M. D. Radiologist, New York Skin and Cancer Hospital; Assistant Neurologist, Vanderbilt Clinic, Columbia University, New York City; Counterirritation, External Applications, Bloodletting, by Frederick A. Pickard, M. D., late Physician to the Pennsylvania Hospital. An Outline of the Principles of Therapeutics, with a special reference to Physiologic Therapeutics, by the Editor. With Addendum on X-Ray Therapy and an Index Digest of the Complete System of Eleven Volumes. Illustrated. Philadelphia; P. Blackiston's Son & Co., 1012 Walnut Street, 1905.

This volume treats principally of subjects which are still in their infancy, but which add greatly to the general practitioner's therapeutic field. The editor is to be congratulated on having secured the co-operation of such able collaborators, who have treated their subjects with conservatism. Serum therapy, by Dr. McFarland, the eminent pathologist and bacteriologist, is considered under two headings—The Evolution of Serum Therapy and Special Serum Therapy; Organotherapy, by Dr. Oliver T. Osborne, is subdivided into parts treating separately Extracts of Thyroid, Thymus, Pituitary and Suprarenal Glands and Animal Extracts, and similar agents of minor importance. Radium, Thorium, and Radioactivity and their uses are ably presented by Dr. Tracy, who has devoted considerable time to the subjects. Counterirritation, external applications of heat and cold, local bleeding, and venesection are ably treated by Dr. Pickard, who under the subject Counterirritation demonstrates with illustrations cutaneous areas reflexly associated with internal parts, and cutaneous vascular areas collaterally related with the vessels of the viscera and to the different spinal segments. Dr. Solomon Solis Cohen adds an editorial addendum on X-ray therapy, relative to new discoveries in physics, improvements in Roentgen-ray technic, and progress in special therapeutics, as well as an outline of the principles of therapeutics with special reference to physiological therapeutics. The work closes with an index-digest of therapeutic

measures by Dr. R. Max Goepp. This volume completes the valuable system which in this time of modern therapy should have a place in every physician's library. The publishers are to be congratulated on having placed before the profession in such an able manner a system so complete and practical. Their work has been well done.

SOCIETY MEETINGS.

(Continued from p. 752.)

THE FIFTEENTH ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

THIRD DAY, THURSDAY, SEPTEMBER 21, 1905.

EXECUTIVE SESSION, 9.30 A. M.; THE PRESIDENT, DR. EMIL
HEUEL, IN THE CHAIR.

REPORT OF COMMITTEE ON CURRENT CLASSIFICATION AND NOMENCLATURE.

Dr. Herdman: I crave the indulgence of the members of the Association for a few minutes in which to place before them briefly a statement on what we all believe to be an important matter. I refer to the work of the Committee on Current Classification and Nomenclature, whose several reports you have had before you during the last three years. I need not detail the work, as the reports speak for themselves. I need not say that the character of the work done by this Committee is of the very highest order, and it has not only been approved by us, but the nomenclature recommended by the Committee has been formally adopted by the unanimous vote of this Association. And yet in the last report of this Committee there is sounded a note of discouragement. Let me read one or two paragraphs from that report:

"The Committee is uncertain what course to pursue. Our recommendations as to changes in Nomenclature, made in the report of three years and of two years ago, have been formally approved by the Association; but our reading and general information indicate that comparatively little effect of that approval is perceptible in the literature of your profession. Further effort toward proper terminology is needed but, unless wisely directed, will fail of its purpose.

"In other words, there is a lot of inertia to be overcome in introducing a reform, even where that reform relates to conceptions and methods of expression. Hence, it seems probable that some means more positive and aggressive than simple reports of a committee, which are quickly covered up by other literature of more urgent and immediate importance, will have to be adopted in order to render our work in this direction more lasting than a ripple on the surface of a fermenting and crystallizing liquid."

I wanted to call your attention to this matter, in order to see if we could not, as an Association, begin to put ourselves on record in regard to this work. Yesterday I sat here for hours listening to several papers, some on the direct current, some on induction coils, others on high frequency, and others on the X-ray and radiotherapy; and I must say that a great share of them were framed in language I did not understand; which would have to be interpreted to me personally if I am to get at the conception that the reader had in mind. I must say that this seems rather ridiculous. We come together year after year and are in the position of the workers on the Tower of Babel, who were said to have been given different tongues. That is our situation. Who of us can expect that we are going to advance this branch of science and art when we do not clearly understand each other when discussing important matters? If we cannot talk in a language which is universal, we certainly can make no progress any more than the builders of that tower who for this reason had to stop work. We must agree upon a universal language in this our work, and I have one or two suggestions to make. I have asked Dr. Snow if he will place a page or two at our disposal in his journal for the publication of an epitome of this nomenclature which may be constantly and readily at hand, so that, when one is writing a paper, he will have the means of making his terminology conform to the report of the Committee, which we have adopted as ours. While I do not feel like offering a resolution which may entail upon the publisher some additional duty which we have no right to ask, I would like to have the sense of this Association as to whether we should ask Dr. Snow to reserve a page or two for the publication of that nomenclature in epitome, so that this would form a running part of the Journal. I propose that resolution. (Seconded and carried)

With a view to carrying out this idea, it has occurred to me also to suggest that the Secretary, when soliciting papers for our annual meetings, and also when dealing with those that are spontaneously sent in for publication, should suggest to the respective authors to adopt the published nomenclature in order that the language used may be universal. This would not be compulsory, but every member will see that it is to his interest to do this if his ideas are to be made intelligible to

everyone. I have with me a recent circular which has been sent to me by the Society of Electrical Engineers. It gives the abbreviations which have been adopted in order that members may understand each other. It is a kind of telegraphic code, which greatly facilitates literary work and furthers the methods of intercommunication. We must adopt something of that sort, if we want to have a scientific basis for progress in this science of ours.

Another suggestion is that our Secretary in his communications with the various persons who are invited to write papers should enclose a reprint of this nomenclature from the *JOURNAL OF ADVANCED THERAPEUTICS*, asking his correspondents to conform to it. (Seconded by Dr. Brinkmann and carried.)

The work of this Committee has been exceedingly difficult, especially as they had no medical associate. In commending their work I am in no way complimenting myself, because I have done none of the work, my name having been added to the Committee only recently, but I would like to have this Association formally present to the other members of this Committee, who are all physicists, associate and not active members of this Association, some acknowledgment of the very thorough, earnest and satisfactory work they have done for us in the past three years, and express the hope that the way will be made clear for the continuance of the same.

President: You have heard the suggestion of Dr. Herdman. I believe it will be becoming and fitting for the gentlemen who are taking office this evening, to have a set of resolutions prepared and sent to the Committee, acknowledging our sense of gratification at the work they have performed.

Dr. Brinkmann: Anyone who is acquainted with scientific work of this description knows that it is a thankless task and deserving of our appreciation. I therefore very gladly make the motion that an engrossed copy of the resolution be sent to the members of that Committee.

Dr. Snow: Using the expressions and language of Dr. Herdman.

President: Certainly. (Carried.)

President: In order to carry out the work under discussion, the Report recommends that some suitable college or association be approached to set aside a fund for this purpose. I believe there are some institutions that would be interested in the further carrying on of this work. It is costly and a sum of at least fifteen thousand dollars as a starter should be set aside. I would ask this Association what steps should be taken to obtain such support.

Dr. Herdman: On this point I have something to say. Realizing that something had to be done in this way, a conviction in which both Dr. Sheldon and Mr. Jenks con-

curred, I took the matter to the Carnegie Institute last June and spoke to the President about it. He was very favorably inclined toward the proposition and asked me to present the matter to the Institute. I showed him the statement and the reports of the scientific work that had been done by the Committee and indicated the universality of its application. He was very much impressed and took it before the Directors. The Directors, two of whom are medical men, considered it very carefully, I am informed, but their final conclusion was that all things medical they had agreed to leave to the Rockefeller Fund to deal with. It so happens, however, that the latter fund is already distributed and we cannot avail ourselves of any part of it—at least, I understand so. We asked at that time for a three years' grant, as we thought we could demonstrate in that time that the work was worthy of continuance. Application has been made to the Rockefeller Fund in a somewhat indirect way, but with the result above stated.

I do not know of any work that will more surely advance scientific methods in dealing with the problems of biology and electrology or radiant energy, as a whole, than such as has been done by this Committee, and I certainly advocate thorough research along these lines. You will find that this Committee has made a discovery also of an important nature which promises to advance the work of wireless telegraphy. This is in regard to their investigation of oscillatory currents which have a relationship to wireless telegraphy, and at the same time have significance also with regard to our work; it is also of interest to know that their researches are important in regard to high frequency currents. You observe, therefore, that the work done by this Committee is not confined in its application to electrotherapeutics, but extends to the whole realm of radiology, and embraces all that is fundamental in this branch of science. Therefore, if any of you know a philanthropist who has more money than he can use in other good work, I cannot point to a better object for its disposal than in assisting the work of this Committee.

Dr. Bishop: One of the best ways to carry out Dr. Herdman's ideas would be to adopt a resolution that papers read at the coming meetings of the Association be not published as part of the Transactions unless the resolution is adhered to. That will make them pay attention to it, or else we are like the Association advocating the adoption of the metric system to which nobody pays any attention at all.

Dr. Snow: I was authorized last year to change such errors, but it is a great deal of work. If I am authorized again, I will attend to it to the best of my ability.

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NO. 2.

PRACTICAL USES OF THE SINUSOIDAL CURRENT.*

BY FRED. HARRIS MORSE, M. D., BOSTON, MASS.

The particular kind of alternating current that I have to deal with in this paper is known as the sinusoidal. It was so christened by D'Arsonval of Paris in a paper read before the French Academy of Science in 1892. Dr. J. H. Kellogg, of Battle Creek, Mich., claims to have used this current from an apparatus of his own quite extensively in his everyday work since 1883. He also described it in a paper read before the American Medical Association in 1888, as a form of alternating apparatus from which various effects could be produced unlike any other electrical modality.

D'Arsonval found that currents of considerable intensity could be passed through the body without producing pain, muscular contraction or chemical change. He also observed that by increasing the frequency of the alternations, muscular contractions could be produced which were infinitely less painful for equal intensity than when the induction coil was used. This he called sinusoidal, because of the wavelike character of its impulse as compared with the more zigzag abrupt nature of the induced current as shown by tracings. To those not familiar with the subject perhaps it would be better understood if I should call your attention to the well-known fact that the induced current is continuous in one direction, but interrupted by a mechanical device, while with the sinusoidal there is a change of polarity just in proportion to the rapidity of the revolutions of the alternator. Consequently, as the stimulant, tonic or sedative effect is desired, by the selection in the use of the coarse or fine wire induction of the so-called high-tension induced current apparatus, so it is with slow or rapid alternations of the sinusoidal, only with the latter, a smoother and more rapid impulse

* Read at the Fifteenth Annual Meeting of the American Electro-Therapeutic Association, held at the New York Academy of Medicine, September 20, 1905.

may be given, hence greater penetrability and a distinct advantage in a large class of cases.

The better I have become acquainted with the utility of the high potential, high frequency currents and mechanical vibratory effects, the more I appreciate the value of the sinusoidal current.

There are many forms of sinusoidal apparatus, but the one that I have used, and am familiar with, was designed by Dr. A. E. Kennelly, and made by the Edison Co., in about 1892. Although this company did not continue to manufacture and sell this particular apparatus, a brief description of it will give an idea of its principle. The alternator itself is about seven and one-half inches in diameter, having inside its outer rim a circle of twelve coils each of which is practically two separate coils, an inner one with eight layers of fine wire and an outer one with two layers of coarse wire. The inner coils are all connected in series and constitute a secondary coil, while the outer coils are connected in another series and form the primary coil of the machine.

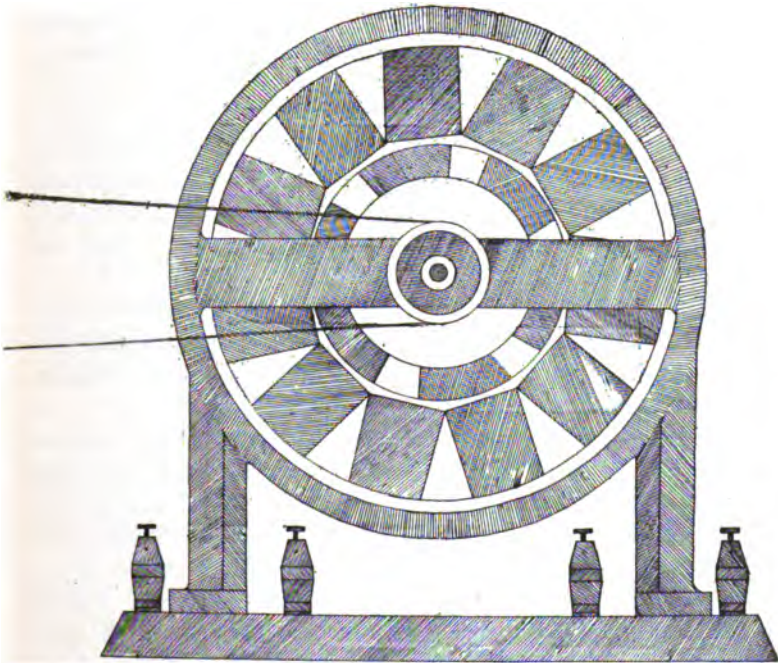
The primary coils are connected with binding posts, from which they receive the continuous current. The sinusoidal current is delivered from the secondary coils to which are attached the conducting cords for the electrodes. The armature, field frame, and cores, which is made of laminated iron, is arranged inside this circle of coils, to which a pulley is attached for a belt connecting the motor. The twelve spools or coils become magnetized in their cores as the current is allowed to circulate through them. Now the magnetic lines of force remain stationary in the cores so long as the armature does not move, but will change from one side of the coils to the other as soon as the motor causes the armature to revolve.

From this induction an alternating E. M. F. must be produced in the secondary coils, and having the proper proportions to the projections on the armature surface, the resulting current-waves may be made sinusoidal.

If the machine be run slowly the alternations and consequent muscular contractions will be in proportion; but at a speed of 4,800 revolutions per minute a current can be produced having 1920 alternations per second. A water rheostat of the Baily pattern is used as a controller, as it seems to be best adapted on account of its small liability of causing shocks.

The apparatus requires no care except the occasional oiling of the motor and furnishing a new sixteen-candle power electric lamp used in the resistance circuit, which consists of two sets, one for controlling the current to the motor and the other the alternator. This arrangement allows most perfect control of alternations and E. M. F.

We have all treated a class of cases and conditions of which I shall speak, more or less with the other forms of electrical



and mechanical modalities, and have obtained good results. But the fact that the sinusoidal current is used so infrequently is not due to its expense, or its being cumbersome, but to a lack of appreciation of its peculiar virtues. This justifies me in being a little enthusiastic in advocating its use.

In using the continuous current, our main reliance is placed on its polar effects according to the special indications, although there is more or less interpolar action. With the faradic or induced form the surface effect is more marked from stimulant action, and is sedative just in proportion to the

rapidity of its interrupter and increased tension, due to a larger amount of windings of fine wire in the secondary coil. This arrangement and use of the high tension induced current coil is of course known to you, but the uses of the sinusoidal can be better understood by keeping this in mind. In using a secondary coil with fine wire for its sedative effect, the interruptions should be of its maximum rapidity, and smooth as regards shock or jerk. By gradually increasing the induction a larger quantity of current may be borne. The effect of this is theoretically to produce sedation by temporarily paralyzing the sensory nerves, and to exhaust the irritability of the muscles, thus relieving painful contractions.

Now all this can be accomplished by the sinusoidal current only carried to a greater degree because of the many times increased alternations over the induced current interruptions. And on this principle, which perhaps is akin to mechanical vibration and high frequency, it is more possible to effect the deep-seated viscera.

Speaking in a general way, I have found the sinusoidal current most efficacious where a deep-seated effect was desired; whether stimulant, tonic, or sedative, likewise slow, medium, or rapid alternations, according to indications.

I mention a few diseases and conditions in which I think most will agree that electricity in some form is the orthodox thing to use. You all have probably obtained satisfactory results from instruments in your possession, but the limited use of the sinusoidal current by those who pretend to do much in electro-therapeutics, in my opinion, is a mistake. I have carefully observed in many apparently parallel cases, its comparative use with the other forms of current. So it is from actual experience, not theory, that I speak.

It is especially indicated in chronic gastritis and duodenitis with or without dilatation, a condition found frequently in persons with thin abdominal walls, complicated with marked prolapsus of the intestines (enteroptosis), chronic constipation, non-purulent gynecological affections, chronic bladder inflammation, neuritis in all its stages, and for its general tonic effect. In the above conditions the object of our treatment is not only to improve the nutrition of the viscera through which the current passes, but the surrounding tissue as well; and these indications are certainly met more emphatically by the

rapid alternations of this wave-like current than by the more superficial stimulation of the induced current.

On the principle that strong continuous currents depress vital tissue, and the inefficiency of the mild, in these cases, again the sinusoidal has its advantage. However, in the gynecological cases the constant current is advantageously used alternating or in conjunction with it. It is in neurasthenia that the sinusoidal is specially indicated because it is less liable to produce accidental shocks, and the harmlessness and advantage of a long séance.

When a patient is so hyperesthetic that the continuous current cannot be used to its desired strength, the susceptibility of the skin may be greatly lessened by first applying a large surface electrode with the sinusoidal current, and then applying it. When this is done the alternator should revolve rapidly. Also when treating cavities by the bipolar method a greater amount of current can be tolerated than with the induced current.

On the principle that disturbance of function in time causes a disturbance in nutrition of an organ, or of the spinal nerve centers in turn sets up structural change; prolonged irritation, or over-functional activity of any of the viscera is necessarily followed by an increased supply of blood, congestion and possible inflammation.

The exudations about the pelvic organs following peri-salpingitis and cellulitis of the soft deposit variety in contradistinction to the hard fibrous adhesions, should when treated electrically be done with due appreciation of the area involved. Neuritis from pressure and reflex neuralgias are so common in these cases and form such a large proportion of the office work of the general practitioner that too often tamponade is the only treatment received.

The use of large abdominal and back electrodes have been productive of best results with me. They may be used with or without the use of a vaginal one, with medium or rapid alternations according to the stage of the disease for twenty to thirty minutes' application, gradually increasing the current to the point of reasonable toleration.

I use it very much more than the induced current because of more satisfactory results. It is certainly more agreeable to

the patient, who usually describes the sensations as a vibratory thrill rather than a muscular spasm.

I do not mean by what I have said that I use the sinusoidal current to the exclusion of the other well-known electrical modalities in the diseases mentioned. But that it has its place in our armamentarium as a valuable adjunct, I am convinced.

Discussion.

Dr. Morton: I certainly think it is to one of our own countrymen that the credit for the first use of this kind of apparatus should be given. It is properly attributed to Dr. J. H. Kellogg, of Battle Creek, who worked it out from 1883 to 1888 with the greatest care. He demonstrated the sinusoidal characteristics, and the physiological action of this current in a thoroughly scientific manner. The recognition and use of this current in medicine was greatly promoted by the distinguished labors of Professor D'Arsonval and his followers.

As to the value of the current, I do not see any special value in it more than that it is an agreeable current. The first model of the present apparatus as used in this country was made for me by Mr. Kennelly in Mr. Edison's laboratory. Therefore I am thoroughly familiar with it. I have had three such machines in use in my office—I have abandoned their further use, for I have never seen any particular result not more easily obtainable by other electro-therapeutic measures.

Dr. Massey: I have also abandoned that apparatus, because it did not give me the contracting power that I am in the habit of using. I know that a great point is made about its sedative action, but I do not like to take my patients' money for that alone. Perhaps I am wrong about that too. My experience has given me greater respect for the stronger current. But I do make this point, that these machines should not adhere too closely to one model, and they have probably been thrown away by some of our best men because the currents produced by them were so light. There are plenty of controllers to put in resistance, when needed, but we want the machine larger, and we want the contracting effect on the bowel muscles,—a painless contraction, which cannot be produced by the ordinary induction current. My machine of this type has not done it. It gave me high tension currents, but no contracting power.

Dr. Brinkmann: I wish to speak on the original fact first and then on another point. In the first place there is an arrangement in the machine, by which the pitch is dependent upon the velocity. There are few motors that run higher than 5,000 revolutions a minute. As all the portions are rotating at that velocity, the maximum speed is 5,000 per minute. I have a device working in connection with a motor rheostat, controlling the speed of the motor and, therefore, the speed of the alternator, so that I can select the desired range of pitch. The gentleman who said he could not secure muscular contraction with this machine ran the machine at a lower velocity, too low to secure sufficient current output.

The second point is this. If the maximum velocity of the sinusoidal apparatus is 5,000 per minute, and if it is a fact that, the higher the vibratory rate, the more rapidly it produces anesthesia, then why should we confine ourselves to a rate so far below other well-known apparatus? I believe there are vibrations with induction currents which give a known velocity of 14,000 to 16,000 per minute, and even much higher, and the various windings allow you to obtain such an effect while working smoothly.



MANUAL THERAPY, AN INVALUABLE AID TO THE ELECTRO-THERAPEUTIST.—A PLEA FOR ITS GENERAL ADOPTION.*

BY JOHN T. RANKIN, M. D., LOS ANGELES, CAL.

Manual therapy has an exceedingly wide range of application in the realm of practical medicine, and to say that its use is of value to the electro-therapist only, would be far from the truth. It would seem that there are very few diseases in which, at some stage, manual therapy would not be of service, and the worker in any branch of medicine would be well repaid by careful study and personal application of this valuable system.

The electro-therapist, however, deals especially with physical methods of treatment, so that manual therapy falls naturally within his province. Manual therapy in its proper and efficient application to diseased conditions should be administered by the physician only, as he alone understands the pathology of the trouble against which the treatment is directed. Let it be understood that the treatment to be here advocated is not the routine stereotyped maneuvers of the indiscriminating masseur, nor the superficial frictions and kneadings of the nurse, whose knowledge of pathological conditions and ways and means of correcting them are about on a par. Those manipulations may be soothing and helpful, but they fall far short of that degree of efficacy which may be secured by the use of specific manual treatment administered by the trained physician. The attainment of success in the use of manual therapy demands the surgeon's knowledge of anatomy, the physiologist's knowledge of function, and a knowledge of abnormal structure and altered function, which comes only to the experienced medical practitioner.

Manual treatment as a therapeutic measure is perhaps as old as the human race and has been used by the medical profession from its foundation, so that by every right it belongs to us as a heritage from our medical ancestors. For centuries it was used in an ignorant and somewhat uncertain manner

* Read by title before the American Electro-Therapeutic Association, New York, September, 1905, at the Academy of Medicine.

and without definite knowledge as to its rational use from an anatomical, physiological, and pathological standpoint. Medical learning as a whole has broadened and become more accurate, and every branch thereof has assisted in bringing this about. A better knowledge of the anatomy and physiology of the nervous system and careful clinical application has given manual therapy a prominent place in the therapeutic list.

It is to be regretted, however, that the physician himself rarely administers the treatment, such work being generally turned over to the nurse or professional masseur, whose qualifications for its ablest execution are very few, and whose interest in the case frequently centers on the fee at the end of the task. We know from the history of electro-therapeutics that the practice of allowing nurse or lay assistant to administer treatment to our patients has contributed greatly to keep electro-therapeutics under the ban, for as a natural consequence the patient loses confidence in an agent that had it been administered by the physician himself, who alone could do it correctly, would have produced the desired effect; and on the other hand, we know that hundreds of laymen throughout the country have received a smattering of electro-therapeutical methods while acting as assistant in the office of the honest and legitimate physician, and have gone forth to prostitute the system by resorting to the nefarious schemes of quackery. It behooves us to be very careful regarding these matters, and though we often need help in our work, when it comes to treatment that is the physician's business and he should not weaken its effect by placing his patient in the hands of a layman. No matter what the therapeutic agent may be, treatment is the physician's business, and his only.

Manual therapy has suffered greatly because we have neglected to personally administer the treatment, but instead have referred our patients to laymen. As a result there has been built up a sectarian system of practice whose adherents claim that their particular method is the sum-total of all that is necessary in therapeutics. Had manual therapy been practiced as it should have been, by physicians personally, this "pathy" never would have existed. Whenever the profession by negligence or apathy refrain from the personal use of helpful therapeutic adjuncts it offers an opportunity for some gold and glory seeking individual to seize upon some

such adjunct as a "wonderful discovery" and make it the basis of a special or sectarian system of practice.

The profession has become so accustomed to having all manual treatment done by laymen that they have almost come to consider that it would be beneath their dignity to give such treatment. Let the nurse or masseur do the general rubbing, kneading, etc., in cases where this is indicated, but, where special manual treatment is needed for a particular abnormal state, the physician, by reason of his training, is the only competent person to administer such treatment. Our great-grandfathers could have told of a time in this country when it was considered degrading for a physician to act as accoucheur, this task being left for the old grannys of the day. But the successful obstetrician of our time is the physician who with great manual dexterity is able to bring the labor to a successful termination. And would he not be severely condemned if he failed to give his patient the benefit of his training, placing her instead under the care of the ignorant midwife during this trying period? If we would be censured for such action during a physiological process, how much more should we deserve it for placing in the hands of laymen, for manual treatment, our patient suffering from various pathological conditions, of which the lay mind is totally ignorant?

Yet we have been doing this for years, and, as a result, many of our states, by legal enactment, have given recognition to the aforesaid sectarian system of practice, placing the practitioners of this school upon a legal equality with the regular physician. Will the medical profession meekly stand by and see this ancient and efficacious method torn from their armamentarium without any attempt to prevent it, or will they, will this association take up the task of placing this valuable branch of physical therapeutics upon an ethical foundation? Great credit is due the American Electro-Therapeutic Association for the present ethical status of electro-therapy.

What has been done for electro-therapy can be done for manual therapy, and if the medical profession will hastily apply the remedy the rescue can be made complete. The formula for this remedy is not composed of argument before legislative bodies, nor in protest to the public, and it certainly does not consist of the plan of training laymen to do the work for us. But, briefly, the remedy is this: Let the physician himself per-

sonally administer the specific manual treatment. In no other way can this system attain its highest degree of efficiency. In no other way can the public be made to depart from seeking this valuable therapeutic measure at the hands of irregulars. Intelligent people prefer to take treatment from legitimate practitioners, from men who have standing in their profession and community, and it is only when they are unable to secure this treatment from ethical practitioners that they seek the services of the irregular.

It was most unfortunate that, in the early days of electro-therapeutical investigation, this valuable agent, electricity, was allowed to become so strongly entrenched in irregular channels. So strong has the hold of quackery been upon it that for decades the struggles of the ethical electro-therapeutist seemed but to slightly loosen its grasp. It appeared to be a hopeless contest, for it was a fight on the one hand to seize from the ignorant and unprincipled quack this helpful adjunct which he had dragged to the lowest depths, and it was a fight on the other hand to uphold to a skeptical and disgusted profession the merits of this abused and prostituted therapeutic system. Many eminent men in the profession had great faith in the value of electricity, but wavered at the thought of entering the lists in a battle against such odds. They realized that their motives would be impugned and their professional characters assailed. It was not the fear of injury from the hosts of quackery, but it was the penetrating thrusts which they knew would be hurled at them by friend and colleague, if they made the attempt to place electro-therapeutics on an ethical foundation by advocating and adopting the use of the system. The fight is not entirely won, as prejudice and skepticism still hold back many of our friends and the grasp of quackery is not yet loosened; but another decade will see such general recognition and adoption of electricity by the medical profession that the charlatan will cease its use from lack of patronage. As the salvation of electricity, as a prominent remedial factor, is coming by our general recognition and adoption, so, in like manner, is manual therapy to be rescued by the profession. Only along these lines can its salvation be made complete.

The title electro-therapeutist is growing entirely too narrow to designate the practice of the present-day physician who has been paying particular attention to the use of the various elec-

trical modalities in treatment. As we go into the offices of the members of this association, not only do we see an equipment for electro-therapeutic work, but our colleagues become enthusiastic in explaining the merits of their favorite mechanical vibrator, and the rehearsal of the clinical success attained by its use is most interesting. The X-ray equipment is noted and the wonders of this potent force are discussed with enthusiasm. The precious tube of radium is exhibited, and there are many queries as to the future of this agent. We see an apparatus for the administration of dry superheated air, an ultra-violet light outfit; arc and incandescent light cabinets are shown us, and they all come in for their share of praise for the assistance rendered in treatment. In fact all of the physical agencies have naturally been taken up by physicians who have given special attention to electro-therapeutics in their practice. By this great broadening of his field the electro-therapeutist of the past has become the physical therapist of the present, and it would seem that the name of this association, to truly represent or designate the practice to which its members are giving special study, should be The American Physical Therapeutic Association.

That electro-therapy and manual therapy are well adapted to support and assist each other may be gathered from a few brief statements as to the physiological effects produced by these means. This matter of physiological effect is taken up in some detail by different physiologists and writers on the subject, so that only a few general and bare references will be made concerning it. In laboratory experiments, upon the various organs and structures of the body, accurate work with instruments of precision gives definite results as to the effects upon these structures when subjected to the action of electrical or mechanical stimuli. But so many varying factors enter into the experiment when we attempt to produce certain physiological phenomena in the intact human organism, that it is manifestly impossible to secure stated results in every case. Experience shows us, however, that we can, by the careful intelligent use of electrical or mechanical stimuli, produce fairly constant effects.

That electricity is applicable to so many different conditions is due to the fact that according as we vary the current and the mode of application we also vary the physiological effect

produced. The manual treatment may also be made to produce varying effects, according to the manner of application, steady pressure producing an inhibitory influence and manipulative motions tending toward stimulative effects. The heart's action may be increased or diminished by electrical currents (1), and these effects may be produced by manual means, using the thoracic method of Oertel, the peripheral method of Schott, and numerous variations. The vaso-motor effects of these agents are frequently very marked, causing a constrictor action in dilated atonic areas and a dilator effect in parts under high pressure (2). The functional activity of the abdominal and pelvic organs may be perceptibly affected by either method and the effect produced by the use of one agent may nearly always be enhanced by the application of the other. Upon the nervous system we can secure, by the proper administration of electricity, a quickening of impulse or action, or it may be made to serve us in lessening the volume or frequency of nerve flow. And in the use of the manual method it may be easily demonstrated that firm pressure upon any superficial nerve has an inhibitory influence, while manipulative treatment has a stimulating effect.

Clinically, therefore, we may exert an anticongestive action upon a congested area by the use of the proper electrical current, and we can enhance this action by manual therapy. Pain may be lessened by one agent and this sedative action markedly enhanced by the use of the other. The two methods support one another in their actions upon spasmodic conditions. Contractions and adhesions may be more quickly corrected by the combined method. Functional derangement of any organ will generally respond much more rapidly to the influence of these agents used in common. Symptomatic treatment of organic lesions, where either of these methods is indicated, will be most successful when manual therapy and electro-therapy are used in combination.

Some patients do not well tolerate electricity, and, in such, manual treatment will often successfully supplant the electricity. But, in general, it may be said that where one method is useful in treatment the other method will increase that usefulness.

In order to apply the treatment successfully, we should refresh the memory regarding the structure of the vertebræ and

spinal cord, give special attention to nerve centers, and study the formation of the anterior and posterior spinal nerve roots. Look up the points of emergence of the nerve roots from the cord in comparison to their vertebral exit. Locate the spinal ganglia. Trace the anterior and posterior divisions of the spinal nerves from their exit at the intervertebral foramina to their destination. In examining and treating one will then be well informed for reasoning from central origin to peripheral distribution, and vice versa.

There may be a question in the minds of some as to the importance of the part played by the nerve center in innumerable disorders, particularly when repeated examinations of the most searching character have failed to disclose alterations in the nerves or cord. We must remember, however, that many cases of spinal and cerebral concussion occur followed by grave and far-reaching symptoms, and yet most careful examinations fail to reveal a lesion (3 and 4). It does not require, therefore, a strained imagination to believe that undemonstrable primary vascular and nutritive changes are of frequent occurrence in the spinal marrow, and that these changes though of a very mild character in themselves are yet sufficient to create, in this delicate tissue, a condition of nerve unbalance, the manifestations of which may, or very likely will, be remote from the site of the affected center. Nor, on the other hand, is it hard to believe that primary visceral derangements may often cause a secondary instability of nerve centers with which they have connection. It is a well-known physiological fact that every organ of the body is controlled or influenced by certain fairly well-defined spinal areas. It seems plausible, therefore, that a functional change in a spinal area, irritative in character, would cause abnormal or excessive action in the organ controlled by that area, or if the change be of such nature as to lessen the normal influence of the spinal center a resulting inactive or dormant condition of the parts supplied by that center would result (5).

Working, then, under the assumption that there does frequently exist a primary or secondary functional derangement of the nerve centers, it is our invariable rule to examine carefully for signs of such trouble which we believe are manifested by tenderness, upon pressure, over the affected center, or at the vertebral emergence of the nerves from such center. Con-

siderable practice is necessary to enable one to correctly differentiate the varying degrees of sensibility found along the spine, and their probable significance. Now in what way are we able by manipulation to affect these spinal areas? If there be present an irritable condition, purely nervous in character, steady firm pressure over the spinal point for from one-half to several minutes will frequently produce an inhibitory action soon manifested in the parts governed by the center. This may be nicely demonstrated in many cases of nervous diarrhea by pressure for three to five minutes from the 10th dorsal to the 2d lumbar vertebræ, producing a marked inhibitory action upon intestinal peristalsis.

If there be an irritable center due to capillary engorgement, it seems a sensible thing to consider that intelligent manipulation may so reach the post-spinal nerves and, through them, affect the local vaso-motor system, thus producing a tonic constrictor action in the dilated and engorged capillaries of the part. So often we have to deal with cases presenting unmistakable evidence of inactive nerve centers, perhaps local anemic conditions causing central nutritional deficiency, and as nature, when physiologically assisted, always endeavors to restore natural function, it is reasonable to suppose that proper manipulative procedures will have a tendency to so stimulate the nutritional activity of the area that the normal equilibrium of the center will result. And even in cases where the integrity of the center be unaltered, manipulation does undoubtedly exert a marked stimulatory action, the influence of which is imparted to the organs dominated by such center.

In regard to the manner of administering the manual treatment, it will be impossible, in a paper of this nature, to discuss the subject other than in the briefest way. Let our belief be understood that there is no contra-indication to rational medication used in conjunction with the treatment. The accepted rules of management, regarding nursing, diet, hygiene, etc., should be carefully observed, as attention to these matters often adds the something which brings success. A set mode of administering a particular treatment is not the essential point, as there might be a dozen ways of doing it, but the idea to be conveyed is that when you have a condition which you wish to influence by manual treatment, think of what you are trying to accomplish and then use the mode which, experience

has taught you, will do the work in the most satisfactory manner. For an example, we will outline in a general way the manual treatment of those cases which are classified under the heading of nervous dyspepsia. We will not attempt to give the varying pictures grouped in this clinical frame, but in general we find the motor, secretory, or sensory functions of the stomach at fault, either separately, or more likely in combination, and the following manual treatment, with some modifications, is applicable to almost every case.

In the use of abdominal manipulation, you must be sure that you have, in your diagnosis, excluded malignant, suppurative, ulcerative, and acute inflammatory conditions. The abdominal treatment is best given with the patient on the back, shoulders slightly raised and legs flexed, to relax the abdominal muscles. The operator, standing at either side and facing the patient, should place his hands, palms flat, over the stomach, surrounding the organ, and with a strong undulating pressure gradually work the ulnar border of the hands deeply in at each side of the stomach, and well up under the ribs. The viscus is now between the hands, and with alternate pressure and relaxation should be thoroughly exercised for several minutes. In like manner the liver should receive some attention and deep manipulation should be given to stimulate the solar plexus, spleen, and pancreas. By this means vascular interchange is increased and regulated throughout the portal system. The normal force is restored to nerves which are weakened and inactive, and an inhibitory action imparted to irritable nerves, all tending toward the restoration of the normal muscular tone and glandular activity of the stomach.

In many of these gastric complaints catarrhal conditions prevail, and it frequently gives good results to have the patient drink a pint of water previous to the abdominal treatment. The manipulative procedures are then practiced and the stomach thoroughly washed, allowing the contents to pass into the intestine, or if preferred the tube may be used, after slight manipulation, and the fluid removed.

Preparatory to the spinal treatment, carefully examine along the dorsal vertebræ, from the 5th to the 11th in particular. The greater splanchnic cord is readily traced from the dorsal spine from the 6th to the 10th, and the lesser cord from the 10th to the 11th (6), and Gray remarks (7) that the greater cord

likely receives fibers as high up as the 1st dorsal. Endeavor to elicit signs of tenderness by moderate pressure between the spinous processes, commencing above and taking them in regular order, then examine the intervertebral spaces on both sides close to the spine, and finally pass out farther and examine along the transverse processes and junction of the ribs. We do not mean to convey the impression that the presence of a tender point in this region is invariably the result or cause of gastric affections, for the distribution of the nerves from this area is exceedingly wide and tenderness here may result from innumerable affections or may be simply a local soreness without particular significance, but we find so often in this area a tenderness associated with gastric affections, which tenderness, by treatment, improves coincidently with improvement in the stomach, that we are convinced of the importance of examination and treatment along the lines suggested.

Let us suppose, for example, that in the examination of our case we discovered marked tenderness in the 5th, 6th, and 7th intervertebral spaces of both sides. We place the patient for treatment in the lateral reclining posture, and the operator, facing the patient, places the balls of his fingers along the spinal gutter, uppermost side, commencing at each extremity of the tender points, then gradually he approaches the tender area, working the fingers in deeply as though striving to strip the gutter of its muscles in the endeavor to reach as closely as possible to the intervertebral foramen, which lodges the ganglia of the posterior roots and transmits the spinal nerves and blood-vessels of the cord. Work in this manner for two to four minutes, or until the muscles feel softened and relaxed. Then proceed with the opposite side in the same manner. The amount of pressure should be regulated by the degree of tenderness. Having finished this proceeding, place the hands over the spine and press the column gently forward with a spreading movement, as though trying to part the vertebræ. If the spinal tenderness be the cause or effect of a condition which is curable, we may expect its gradual disappearance under this treatment, and a coincident improvement will be noticed in the suffering organ or member, controlled by the nerves from this district.

We usually conclude the manual treatment of this disorder by deep manipulation along the course of the pneumogastric

nerves in the neck, commencing deeply under the angle of the jaw and working to the clavicle. As to the value of this treatment along the pneumogastric nerves, we are unable to say, but by withholding it from some of our cases for several weeks and then beginning its use, there has seemed to be improvement in the case dating from its application. Foster says (8) that powerful peristaltic movements may be induced in the esophagus, stomach, and intestines by stimulation of the vagus nerve. So we give the treatment with the idea in view of the possibility of stimulating the nerve to supply its normal functional impulse, which, to the stomach, is largely motor in character.

Regarding frequency of treatment, this is a question to be decided by the physician, but ordinarily it is well, when you can have the patient come daily, to give the manual treatment every other day and on alternate days administer electricity, using the current which seems best suited to the particular case.

Manual therapy may be used with great benefit in practically all of the cases which are referred to the electro-therapist for treatment, and it is our hope that the members of this society and the profession in general will satisfy themselves as to the merits of this manner of usage by investigation and personal clinical application. You have, likely, patients under your care who are not responding to the electro-therapeutic treatment as you had hoped for, and perhaps among these are some who would improve rapidly if the combined method of treatment were instituted. Let us suggest, therefore the advisability of careful tests of manual therapy and electro-therapy in combination. If you have never used the manual method do not expect to become proficient in its use in a few weeks, but work patiently until you have mastered it in all its phases, and you will have added to your armamentarium an adjunct which you would be sorry to lose.

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SCIATICA.*

BY FRANCIS B. BISHOP, M. D., WASHINGTON, D. C.,

Member Medical Society District of Columbia; Member American Medical Association; Member and ex-President of Medical and Surgical Society, District of Columbia; Member and ex-President of American Electro-Therapeutic Association; Member French Society-Electro-Therapeutics; President of the American Committee for the International Association of Physico-Therapy; Delegate from American Electro-Therapeutic Association to the First International Congress of Physio-Therapy, Liege, Belgium, August 12, 13, 14, 15, 1905; Delegate from the Government of the United States of America to the International Congress of Physio-Therapy, Liege, Belgium, August 12, 13, 14, 15, 1905.

Sciatica, owing to its frequency, severity, and its chronic tendency, is at once a subject of interest to the general practitioner and the neurologist. To the electro-therapeutist it is especially interesting as many cases fail absolutely to yield to internal medication, while electricity in one form or another offers the best and frequently the only means of relief.

It matters but little how expert one may become in his knowledge of the physics of electricity, and its action upon the human tissues; if he is not equally expert in his diagnosis, his remedies will often increase instead of diminishing the malady. Therefore, no current of electricity should be applied to a painful nerve until the physician is thoroughly satisfied as to the true nature of the disease and if possible its underlying cause or causes. It is decidedly better to do absolutely nothing until one has by a careful study of the case in hand fully determined as to the best course to pursue, for in sciatica, as in many other painful conditions of the nerves, the etiological factors are numerous and varied, and it is often with the greatest difficulty that one is able to draw the line between a neuritis and a neuralgia; yet it becomes necessary to make this distinction if one wishes to obtain the best therapeutic results.

A sciatica may be produced in a susceptible subject by slight continuous or interrupted pressure, either in the pelvis or out of it in any part of the nerve, and may be due to the unequal pressure of a badly fitting shoe, a loaded rectum, or a mis-

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placed uterus, sudden chilling of the body, malarial and other toxic effects. Any or all of these influences may produce a neuralgia directly or reflexly, or they may under favorable conditions produce an interstitial neuritis or a peri-neuritis. At the same time one must not lose sight of the possibility of the localized pain being due to some organic lesion of the spinal cord, which will be readily revealed by a careful examination. There are so many causes for, and conditions accompanying, sciatica that it really seems more like a manifestation of underlying causes than a disease pure and simple. Often after the cause has been discovered and removed the pain continues in consequence of a congestion or a disordered nutrition of the nerve; and in either event we have in electricity the remedy best suited to the relief of these conditions. There is still a great diversity of opinion as to the best method of treating a neuritis. So able an authority as Dr. William James Morton advocates most strongly the static spark, others the wave-current, while there are many who have only praise for the high-potential high-frequency currents, while still others are loud in their commendation of some one of the many modifications of the continuous current; and recently in very acute neuritis the ultra-violet light and the X-ray, as well as the incandescent-light bath, have enthusiastic advocates. There can be no doubt that all of these methods are useful in the treatment of neuritis. Each in its turn is applicable to some form or some period of this painful malady. We all have our own special methods of applying our remedies to our cases of sciatica, and it is only by an interchange of experience that we may hope to reach the most perfect knowledge attainable in the pursuit of our science, and my purpose in bringing this old and apparently unimportant subject before the association is to express my views and give my methods of treatment, not in the hope of adding anything to the knowledge already existing, not with the expectation of teaching any new principle, but with the hope and expectation of learning much from the discussions which may follow.

When I am satisfied that a sciatic pain is due to neuritis, after ascertaining and removing, as far as possible, the cause, my method of treatment is selected to suit, according to my judgment, the stage and degree of inflammation, treating it on the general principles of inflammation of other tissues,

bearing in mind always the delicate structure of nerve fiber and the tendency of the inflammation to extend, even to the destruction of the nerve. So when the inflammation is acute, the nerve swollen and tender to the touch, my practice is to use a very mild stable continuous current of a few ma. with the negative electrode over the seat of inflammation and the positive over the lumbo-sacral region. This current is allowed to pass from fifteen to twenty minutes, and is followed by a current of a fine vibratory character. This current I had the honor to introduce to this association at the meeting in 1900.

A pad wetted, or a piece of tinfoil, is placed over the seat of pain and attached to the negative side of a static machine (for this purpose I prefer the small 26-inch-plate machines to the larger ones), the positive side is left open, or, in other words, is not grounded using the surrounding atmosphere for the positive. The sliding rods are approximated the machine started; now the sliding rods are carefully and gradually withdrawn until the patient feels the slightest vibration under the pad, at the same time he gets a general vibration from the surrounding atmosphere without muscular contraction.

In the subacute stage, the continuous current is frequently dispensed with, while the vibratory current above mentioned may be used a little stronger. In order that I may not diminish the rapidity and fineness of the vibration by withdrawing the sliding rods too far, I often increase the strength of the current by lowering my canopy and bringing it nearer the patient; this being suspended by a dry cord, acts as an accumulator, and increases very materially the strength of the current.

The chronic stage, if accompanied by loss of sensation and partial paralysis of muscle, is treated very carefully with the interrupted continuous current to stimulate slight muscular contraction, while the Morton wave-current is applied to the spine and the painful areas. Some old cases have yielded after this treatment had been faithfully applied to the lumbo-sacral plexus, by means of a glass electrode in the rectum. Whatever course we pursue, we need patience and perseverance in cases of long standing.

The neuralgic or true sciatica will in most cases be benefited by some medication in connection with electricity, and long before Dr. Morton suggested artificial fluorescence of the

tissues, it was my custom to give quinine in these cases quite to a degree of tolerance, not of course knowing why my patients did better while taking the quinine and electricity together than when taking the electricity alone. His treatment is scientific, while mine has been empirical; especially has the treatment with quinine been followed when there was the slightest suspicion of a malarial origin. My successes in the treatment of neuralgia of the sciatic nerve have not followed a uniform method of treatment. I mean that some cases have yielded to the continuous current (always strong), others to the Morton wave-current, and still others to the static spark. But the greater number of my successes in the treatment of a neuralgia have been due to the use of the continuous current. large positive over lumbo-sacral plexus, with smaller negatives over the painful parts of the nerve along the course of the limb. The current is gradually turned on to fifty, sixty, or seventy milliamperes and allowed to remain twenty and frequently thirty minutes. Again in these cases I have frequently found the wave-current applied to the lumbo-sacral plexus, by a glass electrode in the rectum, followed by very gratifying results, or use of the interrupted current in the rectum. In any case, we must remove the cause, and if we find a case complicated by malaria, gout, rheumatism, diabetes, albuminuria, or other systematic diseases, we will aid very materially the cause of electro-therapeutics, as well as that of our patient, by not only applying the rational medical treatment, but, in addition to electricity and medicine, prescribing a judicious and well-regulated diet.

£ 1913, I Street, N. W.

Discussion.

Dr. Walter Henry White, Boston: I am glad to have heard Dr. Bishop's remarks and can safely coincide with him in his manner of treatment. It is certainly a difficult point to decide whether we are confronted by a neuritis or a neuralgia, and often a mistake will occur in the diagnosis, so that the consequent treatment may tend to aggravate the case. However, given Dr. Bishop's methods and a competent physician, a correct diagnosis will no doubt be arrived at.

Dr. Brinkmann: I was glad to hear Dr. Bishop attach so much importance to the question of diagnosis, because a cure of

sciatica depends upon a clear and accurate conception of what we have to meet. I believe before a physician can form a conception of the condition of the nerve, he must form a conception of the patient. He must make a blood and urine analysis, a general physical examination, and finally he comes to the examination of the nerve. He then endeavors to find out what has led up to that condition. If he takes the physical condition in the pelvis into consideration as near as possible to the nerve, he will come near the right conclusion every time as to its nature and location. As to the question of neuralgia and neuritis, many cases of neuralgia yield to the proper use of the enema and require no further treatment. After you have excluded tumor and organic pressure conditions, and you find nothing in the pelvis and spine, then you may start on an outside pelvic investigation. As to the examination of nerves, you must not forget that we have two sets of nerves, the efferent and the afferent, and the pains they produce are totally different. Ascending neuritis or descending neuritis leads to trauma with conditions similar to what Dr. Bishop said about injuries to the foot, but they are frequently caused by bruises of the shin and other conditions of that kind.

As to the character of modalities used for the various conditions, I agree with Dr. Bishop that, if you have an organic condition of the neuralgic nerves and you wish to obtain the whole effect of the electric current, you must use the continuous current. It is a perfectly well-known fact that at intensely high rates of oscillation there is a limit of sensation producing analgesia. Whether you employ a multiple high pitched or a single pitch induced current, or mechanical vibration, you will get the same result. But in mechanical vibration you vibrate the nerve at all the points. There are two physiological points: the first is that the longer the distance on a nerve between the electrodes, the greater is the physiological effect of the current where there is bipolar application. The second is that the applications which are made with the electrodes, where the area is large, are much more perfect than where the pressure of the hand is continually varying the lid of the meter. By fastening the electrode mechanically after you have once fixed your meter, a large area is subjected to the action of the fluid.

Dr. Charles R. Dickson: The limited time at our disposal

makes it impossible to discuss this paper in the exhaustive manner in which it should be discussed, and one must just select one or two points from the whole field. I find that a great deal of good can often be accomplished in the early stages of the trouble by the use of a vacuum electrode attached to the positive pole of the static machine employing the wave-current and applying it along the course of the nerve. Neither counter-irritation nor anything else can compare with the continuous current in many acute conditions.

As regards the use of the static spark in more chronic cases, the effect is not merely local, but produces good general results also. I sometimes have patients apply Betul-ol and then employ the static spark over the locality. This often gives a great deal of relief. A number of things might be said also in connection with mechanical vibration, but time forbids. It is of great value in these cases, but the chief point is to diagnose the case correctly.

Dr. Strong: What interested me particularly about this paper was the mention of the vibratory current obtained by the spark discharge from the static machine. Many of you know that I have spent years in the study of oscillatory and other currents, and was struck by Dr. Brinkmann's remarks that the treatment of any condition depends not upon the nature of the current, but upon the frequency of vibration. I believe that it is possible for us to simplify our technique to a great extent by a combined or individual study of the relations of frequency in vibratory currents to their therapeutic effect. I believe that a certain range of frequency enables us to control the conditions of the motor nerves. If we use the high-frequency current, as Dr. Brinkmann says, to obtain analgesic and anesthetic effects, we have obtained our vibration roughly with the normal form of oscillation of the central nervous system. I believe that the keynote of therapeutic measures in the future will be the study of what actually goes on inside the nerves, and that physiologists have made a mistake in not endeavoring to measure the electric current from its effect upon the nerves. We all know that the nervous currents—whatever they may be—resemble electricity in many ways, but if we endeavor to measure their voltage and amperage, we obtain no results. We are not dealing with a continuous current in one direction, but with an electrical oscillation, and I hope that in the future

physiologists will direct their investigations upon nerve energy from this standpoint. I believe that the results will be very useful. I also believe that Dr. Bishop, in applying this current to the treatment of nervous diseases, is on the right track and that by a closer study of frequency in relation to therapeutic measures we can simplify our technique to a great extent and that it will enable us to bring order out of chaos in a large number of difficult conditions.

Dr. Nunn: During the discussion of this paper it has occurred to me to draw upon my memory about a case which once troubled me a great deal. A lady had what appeared to be a neuralgia in the right thumb which hurt her intensely. All my examinations were attended with negative results. By accident I found when she took off her shoe on the side on which that thumb was, the pain disappeared. It was nothing but a reflex action of pressure upon the great toe. I mention this simply to draw attention to the fact that the reflexes are those phenomena which trouble us most in our diagnosis, and it is extremely difficult at times to exactly locate the point of irritation from which the reflex action proceeds.

This meeting has been to me one of considerable pleasure—I might say of greater pleasure than any which I have attended—not in a social way, not in the kindness displayed towards myself—that has always been a moment of gratification to me—but in the advances that are being made by this Association in the study and adoption of the mechanism of nature, which have been most extraordinary. I may be forgiven when I say in the presence of the gentleman who read the paper, that one of the most valuable contributions to our literature upon this subject has been the paper read by Dr. Herdman in the beginning of this Convention. The last speaker struck the keynote: it is a question of vibration entirely. It is a question of understanding the primary principle of vibration that is at the bottom of all life. Let me illustrate by an instance what I wish to say. A singer strikes a keynote, or a certain note is struck on the piano: it vibrates all over the room to whatever part of the room you go. You all remember the story of Brunnels Bridge. A poor fiddler came along one day and asked for a donation which the men on the bridge refused. Then he began tuning his fiddle and struck the keynote so persistently that the bridge began to sway, and the men had to

pay him to desist. In military marches the soldiers have to break the step when walking over a bridge to prevent it setting up vibrations, and at Niagara no dogs are allowed to cross the Suspension Bridge, because they will start the vibration.

Referring again to Dr. Herdman, and the vibration of these ions, whenever you can attune yourself to their requirements you are right, because there is the keynote in our effort to cure through vibratory measures.

One word more and I will stop. It is proper that we should not forget the efforts made by the early members of this Association whose memory is now but a name. We should not forget the early efforts in the direction of the utilization of high-potential currents—I should say, of course, high-voltage. I wish to draw *en passant* attention to the difference between high voltage and high frequency. One is a question of vibration and the other may be one of interruption. Dr. W. F. Hutchinson of Providence, R. I., was, I think, the first to draw attention to the analgesic effect of the high-voltage currents combined with rapid interruptions, and he constructed a machine which had a peculiar interruptor which could be attuned so that the tuning of the interruptor would to a certain extent enable one to strike the proper vibration, and he found, when the proper vibration has been attained, that the analgesic effect was quite remarkable.

Dr. Snow: The subject of the diagnosis and treatment of sciatica is of so much importance and interest that I would like to add something of my experience. Dr. Bishop called attention to the importance of correct diagnosis. I have a large number of cases of neuritis and neuralgia under observation in my own experience. Most of them were neuritis with a local inflammatory process somewhere in the trunk of the nerve. The indications are to relieve the local congestion and restore normal conditions where the real trouble exists. The pain may be in the toe, and the lesion in the pelvis. In my own cases the great majority, fully 90 per cent. in about 200 cases, were caused by a lesion at the sacro-sciatic notch. The principal thing is to locate the lesion and there to apply the static wave-current or sparks. This also applies always to the treatment of a congested area, the principle of application being to locally remove induration and restore circulation throughout the congested area. The static spark has in my hands always been successful in the treatment of these cases, associated with the static wave-current.

The X-ray undoubtedly induces absorption of chronic exu-

dates in chronic cases in the affected area and where a localized scar tissue is causing pressure upon the nerve trunk. In nearly all my chronic cases I apply the X-ray, but not to the extremity of causing a dermatitis. It seems uniformly to hasten recovery in chronic cases; has, I believe, a marked effect in these cases.

As to frequency of the current we employ, we do not aim to produce the vibratory effect in the nerve, but in the structure surrounding it. Tissue contraction restores the circulation to normal tone, drains the inflamed area, relieves pressure and pain and promotes repair. To sum up, we have arrived at the following conclusions:

- (1) Local lesions are present in nearly all cases.
- (2) Administration of means is indicated which will remove stasis and restore circulation, and thereby remove congestion.
- (3) The X-ray is invaluable in chronic cases.

Dr. Johnston of Hartford: Determining the cause of a sciatica is very important, but at the same time a very difficult problem. I have had one case which may be somewhat unique. The patient, male, had a chronic neuritis for three years and was suffering from a most obstinate sciatica. He came to New York and went to various electrical specialists with no relief. Finally I operated on him with the idea of curing this sciatica, and there I found—as you will always find in long-standing cases—pelvic exudates. These were carefully dissected out and the man made a good recovery: he has never since had sciatica. This shows, therefore, that the advice which has been given, always to examine the pelvic cavity, is very important.

Dr. Massey: I wish to mention one point in reference to the diagnosis of neuralgia and neuritis. We know that it is difficult of determination. Possibly all cases of neuritis are reflex ones. Some may be very slight. I am speaking of the gross diagnosis. One is influenced by the fact that the patient is in bed. Those of you who were here several meetings ago, will remember how I recalled several cases of bedridden patients which I treated as ordinary sciatica—invariably with failure to relieve. The reason was that I used the constant current in those cases. That at least is my interpretation, but it may be worse. So I was compelled to conclude that the constant current, elaborately carried to the bedside, will make your patient worse.

The other case, in which there were grosser variations between mere sciatica on the one hand and neuritis on the other, resolved itself into the hypothesis that the differentiation ought to be determined by reaction, that of the former resembling somewhat a subacute case of neuritis.

Dr. Tousey: When Dr. Bishop made his remarks about the difficulty of differentiating between neuritis and neuralgia, he

should have called attention to the points of difference he makes.

Dr. Bishop, in closing, said: As Dr. Tousey's question is the most direct, in answering him I think all of the points in the discussion will be covered. The paper itself, I think, answers Dr. Tousey's questions, although these points may not have been brought out as clearly as I may have wished, or perhaps my reading was indistinct. I tried, however, to draw the line between neuralgia and neuritis as clearly as possible, especially as regards their treatment. In neuritis the pain is constant, and over the course of the nerve and its branches pressure always causes pain. Hyperesthesia, or anesthesia, over the course of the nerve, with diminution or loss of reflex on that side. In advanced stages muscular degeneration. In fact, the symptoms are like the symptoms of neuritis; if in active nerves, neuralgic pain is intermitting, coming on in severe paroxysms and sometimes almost, if not entirely, disappearing. And, while we may have points painful on pressure, they do not extend along the course of the nerve, and are not painful all the time. If I have a case of sciatica in which the symptoms of acute neuritis are marked, I begin the treatment (after ascertaining and removing as far as possible, the cause) by a very mild continuous current. I prefer the current descending, with the positive over the lumbosacral region and the negative over the area of greatest pain; with electrodes fixed immovable, I give a stable current very gradually turned on, until it is barely perceptible to the patient, and placing the limb in as comfortable a position as possible, the current is allowed to flow until the patient begins to feel a warm, soothing effect, watching the man all the time to see that there is not an increase of current as the resistance of the skin diminishes. The treatment is continued for at least a half-hour each day. In an acute neuritis I never hope to relieve the pain completely with the first treatment, as we have here an inflammation of the structure of the nerve, or its sheath, or both, and experience has taught me that in treating an inflamed nerve I must treat it in such a way as to produce as little reaction as possible. And we know that a reaction is generally proportional to the action, or the strength of the action; so I have always felt that I could not treat inflamed nerves very vigorously without doing harm. Rest in neuritis is, in my opinion, always advisable.

In subacute neuritis with less, but continuous, pain, I use the continuous current as in acute neuritis, but a little stronger, but not enough to produce cramp or pain in the muscles. This treatment is alternated with the unipolar wave-current.

It was my great pleasure to introduce this current to the profession in a discussion before the American Electro-Thera-

peutic Association at a meeting in this hall September, 1900 (at the time Dr. Morton was exhibiting what is known as the Morton wave-current). This unipolar wave-current is a current of extremely fine vibration and very soothing. A wetted pad or piece of tinfoil is placed over the painful nerve and attached to the negative pole of the machine. The positive side of the machine is left open, or ungrounded. So we place in resistance the atmospheric air. The sliding rods are approximated, and the current turned on. Now separate the rods, until the gentle vibration is barely perceptible to the patient. The patient being in a comfortable position, allow the current to flow for half an hour. Under no circumstances must there be muscular contraction from the current. I have used this current in selected cases for a number of years with the happiest results.

In the chronic stage, with pain and paralysis, and often more paralysis than pain, I use an interrupted continuous current, just strong enough to produce gentle contraction of the muscles, spending not more than two or three minutes over each muscle or group of muscles. Then the patient is placed on the platform and the Morton wave-current carefully administered over the sacro-lumbar plexus, and with a straw broom I conduct the current gently over and down the limbs, careful all the time not to do too much and thereby excite an acute inflammation, trying always to avoid reaction. When, on the other hand, we have in sciatica a neuralgia, the congestion is probably in the structure surrounding the nerve and often causes pain by an irritation pressure. Or it may, as in neuritis, be due to some toxic influence; in either event we must remember that we are physicians, go back to first principles, seek the cause and if possible remove the cause, and the rest of our work in many instances is comparatively easy. I have found in most cases of neuralgia of a congestive nature, the wave-current or vibratory current (first mentioned, I believe, by me before the American Electro-Therapeutic Association in Toronto, Canada, in 1895, in a paper entitled "Some Experiences with Static Electricity in Functional Nervous Diseases" and afterward brought prominently before the world by Dr. Morton as the Morton wave-current). Or the fine vibration from a mechanical vibrator over the congested points will often quickly relieve and eventually cure the case.

So many times we see reported in print a case of sciatica cured by such and such method; this tells us simply that a case of sciatica has been cured without telling us anything about the cause and character of the pain, and while the treatment in these cases may be very satisfactory to the patient and physician, such a report adds but little to our knowledge of the application of electricity to any given case under consideration.

I thank the members for their free and courteous discussion of my paper.

SYNCHRONOUS MULTIPLE-PITCH VARIATION AND INDUCTION CURRENTS.*

MORRIS W. BRINKMANN, A. B., M. D., NEW YORK.

In the first paper which the writer presented upon the topic of selective electric harmonic vibration, the physics of this subject was reviewed and a number of theoretical reasons were given for the different indications in therapeutics for this type of currents.

In the second paper, which I had the pleasure of reading at the last annual meeting of this association, I reviewed the results of practical work done with these currents, summarized this work and stated certain broad principles. By means of the principles stated it is possible to select pitches and combinations with great accuracy to attain definite results. Both of these papers, however, dealt with currents of synchronous, multiple, and unvarying pitches. Therefore the number of vibrations in each component unit of the multiple-pitch current produced continues to be generated uniformly and the resulting compound current remains uniform as to pitch—the potential and quantity of course being capable of variation, in accordance with the arrangement of the coil with reference to the input into the primary and the inductance and windings of secondary.

I now wish to bring to your attention a new line of thought, with reference to a peculiar series of phenomena as occurring more especially in string instruments and in the animal larynx. We are all of us aware that when the tension of a string is altered when vibrating, its pitch varies directly with this alteration of tension. Further, when the tension of a string is not altered but the length of it which is allowed to vibrate is altered, there is a corresponding proportional variation in the vibratory rate or pitch—that is, the rate is proportional to the tension and the length. The animal larynx obeys the same law, and the notes produced are proportional to the tension and length of the vocal chords as well as the reed character of the glottis.

These preliminary physical considerations being given their proper consideration, we are prepared to take up the theories.

* Read at the Fifteenth Annual Meeting of the American Electro-Therapeutic Association at the New York Academy of Medicine, on September 22, 1905.

and facts as applied to ribbon vibrators or interrupters in induction coils. The fact that a ribbon interrupter when actuated in an induction coil, will produce pitches or interruptions in exact accordance with the tension of the ribbon, is evidently in line with our physical reasoning. When several ribbon interrupters on the same coil are caused to have their tension synchronously varied, there are synchronous variations in pitch in all of the ribbons. If now the intervals, that is pitch or musical vibration rate per second, are adjusted on all the ribbons, and an apparatus be provided for exerting and increasing an equal tension on all the ribbons synchronously, there will be developed a rise of pitch in each of the ribbons synchronously. As the rise of tension will be equal in all the ribbons, the rise in the pitches will also be uniform.

Reverting now to the fact that these ribbons are acting as interrupters to an induction coil, we at once see that we have a device for generating induction currents of varying pitch, single or multiple, harmonic or unharmonious. The speed of these pitch variations is capable of regulation within certain limits by means of the device later described and demonstrated.

This current we can accurately call "synchronous, multiple-pitch variation, induction current."

These currents will be harmonic or unharmonious, according to our adjustments of our ribbons prior to starting the tension-altering mechanism. For the purpose of producing this peculiar and complex current, I have devised an apparatus which is here for your inspection.

A high-speed electric motor, capable of exerting the proper energy in foot-pounds, the speed of which is controlled by its own rheostat, actuates a set of gear wheels so arranged that the small wheel on the motor shaft drives a large wheel; the large wheel actuates a system of levers which exert a pull of considerable power, but in which the range of motion is small—reduction of speed in this manner securing increase of power and small reciprocating movement. This reciprocating movement is communicated to a metallic slide, to which slide one end of all the ribbons are attached. Parallel to this movable slide working on a gib, is a fixed slide to which are attached the fixed ends of the ribbons.

You will observe that the tension adjustment of the ribbons are made at the zero point of the lever, in order to secure

primarily low or high pitch, harmonic or unharmonious intervals.

On starting the motor we get alternate increases of tension and relaxations of tension, and we observe the uniformly proportional and isochronous variations in pitch.

This is a form of harmonic vibration not included in my original classification in the fall of 1903, but evolved since that time.

The phenomena which called my attention to the possible therapeutic value of this current, is found in the fact that whenever there is a variation in the pitch of an induction current traversing animal tissues, there is not alone a (1) sensory response, but a (2) motor reaction as well. (3) That this variation in pitch is able to produce a response where a uniform pitch does not do so. The value of this fact is obvious.

Physiologically one observes a most peculiar sensation when a single low pitch is raised, without sensible break in pitch variation, up to a maximum, and then reduced just as uniformly to a minimum. Nearly all persons laugh involuntarily; upon the continuance of this phenomena it becomes an intense irritant to the auditory apparatus and thus reflexly to the whole body. A combination of notes acting synchronously has a similar and more intense effect.

The possibility of securing peculiar responses in the sensory as well as the motor apparatus as also on glandular organs, was ample inducement for the writer to pursue this subject carefully from its theoretical and physical side as well as its physiological aspect.

A further consideration must be discussed wherein the value of this device becomes still more apparent. In a previous communication the writer made the statement that all tissues were more peculiarly responsive to certain vibration rates and combination of rates. It becomes quite obvious that at some point in the range of the apparatus, a tissue under observation will best respond, by noting this pitch; we have a means for determining the particular pitch best suited to develop responses in a particular tissue. In other words we can thus determine the pitch with which a tissue is in consonance, or stated still differently, we determine the attunement rate of the tissue.

A special device, which has been found necessary to deter-

mine the vibratory rate of steel ribbons, used as interrupters, for harmonic coils, was devised. The factors are (1) a special grade of steel of (2) definite micrometric thickness, and (3) of determined length and (4) of definite tension.

These requirements have been met by securing after many experiments a specimen of French steel, high carbon, micrometer (.003) three thousandths of an inch, and testing same on special testing machines.

In the first device a standard spring balance records the tension on the ribbon, the lower end of the ribbon being secured to a slide actuated by a screw which has a pitch of twenty turns to the inch; while the upper end of the ribbon is attached to a device fastened to the lower end of the balance. The ribbon has its soft iron armature and platinum contact point upon it. The vibratory movement is secured by the usual electro-magnet and micrometer screw with platinum point.

Tension is developed in the ribbon as the slide on the lower end of the ribbon is drawn down by the screw. The record of the tension in pounds and ounces is read off on the balance. The electro-magnetic action on the armature of the ribbon gives the vibration. The length of the ribbon is measured between the points of attachment where it is free to vibrate. Pitch is then determined by the musical note produced, or can be measured by means of the chronograph. The maximum amount of tension which the ribbon is of sustaining is determined by another device. The latter consists of a slide actuated by a micrometer of 20 pitch for the movable end of the ribbon, whereas the fixed end of the ribbon is fastened to a fixed point on the device. Upon exercising tension through the micrometer upon the slide, and thus upon the ribbon, its limit for elongation is determined by the turns of the micrometer screw.

Through the relationship of pitch and turns of the screw micrometer and pounds and ounces recorded on the balance testing machine, and the fact that the same pitch screw is used on the other device, a simple calculation in proportion gives the tension at the point of elongation. We can thus determine the tensile strength of the specimen for elongation as well as for rupture.

Editorial.

MANAGEMENT OF CONDITIONS OF LOW VITALITY.

THE conditions present in the convalescent and the physical weakling from whatever cause call for an active re-awakening of functional activities. That functional inertia due to a weakened or depleted condition should be restored by internal remedies other than foods, which furnish nutrition, is questionable. Food, as a rule, is repugnant under such conditions, appetite returning as the restoration of a more active metabolism creates in the tissues a call for nutrition. Exercise which consumes latent energy, in the healthy organism is necessary to maintain the balance of supply and demand. In enfeebled states, however, the employment of exercise such as would set up general activities is impossible because of general inertia. The demands, then, are for measures that shall act upon the body in such a manner as to induce increasing activities within the organism without fatiguing the parts, and at the same time without increasing the calls upon the organism to dispose of the resulting residue and possible injurious effects apt to result from some medical agents.

Following severe illness or protracted ill health with general functional inactivity, the system is certain to suffer from varying degrees of auto-intoxication and the presence in the tissues of effete materials that call for energetic measures to induce their elimination.

In these conditions also, relaxation with consequent local hyperæmia in the circulatory system are an added impediment to ultimate recovery.

Mechanical agencies best meet the indications in all cases where sluggish metabolism and relaxed conditions, which do not favor tissue exchange, interfere to induce activities which will carry away effete or toxic products and absorb and appropriate nutritive pabulum. To produce these results, the

measures employed must be diffusive, penetrating and energetic to the necessary degree and, at the same time, either incapable of any deleterious action, or capable of measurement under judicious management.

The means at command that are safe and effective produce mechanical effects. They are physical agents that induce vibratory impulses, and are either applied as such, including mechanical vibration, light, heat and massage, or agents which by exciting impulses of tissue contraction stimulate intrinsic action in the tissues themselves, as the electric modalities of high potential and low frequency or periodicity. Such currents are particularly effective when administered from one pole. Interrupted administrations of radiant light and heat, interrupted mechanical vibration and cold, when tolerated, are also effective.

By a scientific adjustment of these and other mechanical measures, together with proper attention to diet, cleanliness, exercise and ventilation, normal functions resume, appetite returns and health is restored. No other course of procedures can be so successful in restoring normal conditions as those which induce a general cellular activity, leading up to normal activities as they do when only functional derangements are present.

When organic disease exists the same course of treatment offers most for the relief of the resulting general effects of the disease.

When conditions arise, as is so commonly the case, from local congestion, which are associated with pain and suffering, these same mechanical measures will by relieving congestion remove the causes of impaired health. Otherwise a surgical measure must or should precede treatment by physical agents.

Those who have or do hereafter become familiar with these means of restoring normal physical conditions will seldom resort to the employment of the still generally proverbial methods which so often prove unsatisfactory.

Progress in Physical Therapeutics.

GYNECOLOGY AND METALLIC ELECTROLYSIS.

EDITED BY G. BETTON MASSEY, M. D.

Mercuric Cataphoresis in Diseases of Women.

Dr. Francis B. Carleton of Boston, Mass., writes a forceful article on the above subject (Boston Medical and Surgical Journal, October 26, 1905). Many women are now subjected to operation; notably ovariectomy, when a more conservative method of treatment would not only save the ovaries but would leave the patient in far better condition than does such operation, even with the most favorable outcome. "At the same time, no one realizes any more deeply than myself," says Dr. Carleton, "the immense value of surgical operation and the great debt which mankind, and particularly womankind, owes to surgery. My point is simply this: We should operate and advise operation only when it has been thoroughly demonstrated that such operation offers a better chance for the life and future health of the patient than any other procedure, and it seems to me that it is a physician's duty to familiarize himself with any method of treatment which offers his patient a fair prospect of cure without resorting to radical operation, and this is precisely what mercuric cataphoresis does. . . .

"Let us consider a case of pelvic trouble; no particular case, but just one of the common ones which so obstinately refuse to be cured by ordinary local treatment. We are considering the advisability of operation, but decide to first try mercuric cataphoresis. The patient is in the peculiar nervous condition so characteristic of this class of cases. She takes the cataphoric treatment with a very good prospect of cure. But even if it doesn't cure her, and operation be finally resorted to, it helps her nervous condition, reduces pelvic congestion, tones up the vaginal mucous membrane, the muscle of the uterus and its ligaments, and last, but by no means least, it has probably entirely relieved her pain. In a word, she is far better able to withstand operation and has a much less protracted period of convalescence than she would have had had operation taken place without the electrical treatment.

"My objection to surgery in these cases isn't because patients die as a result of it, for, as a matter of fact, they usually do not, and operations unquestionably cure many, many times. Often, however, the reflex nervous condition, that exists as a

result of operation, is, if not dangerous to life, about as hard for the patient to bear as was the original disease for which the operation was undertaken. Removing a diseased ovary certainly precludes all possibility of future disease in that particular organ, but I think you will agree with me that it is vastly better, when possible, to leave that ovary where Nature put it and cure its disease there. The Massey treatment does just that and, in addition, it does not confine the patient to bed, is not painful, is comparatively inexpensive and absolutely devoid of danger, which points all appeal to the patient as well as to her medical attendant.

"I trust the following reports of cases in which this treatment has been used will be of interest:

"Case I. Mrs. R. W. E., thirty-one. One child, five years old. One miscarriage at four months, two years ago. Profuse menstruation. Uterus low and subinvolved. Both ovaries tender and practically constant pain over ovarian region.

"Treatment by mercuric cataphoresis entirely relieved pain in three applications. Three treatments were given the first week and two each week for the next six weeks, omitting them during menstrual periods. Patient reported much less flow at second menstruation after commencing treatment and her general health is much improved. She has had but one treatment since second menstruation, says she is well enough and doesn't need any more, and rather against my advice is now taking an extended tour through the West.

"In cases like this one it is to be borne in mind that excessive menstruation is just as debilitating as is hemorrhage from any other source, and an improvement in general health may always be anticipated when the flow is reduced in amount. And, as in this case, when pain is almost constant, relieving that, will, unquestionably, be a great factor in improving the neurasthenic condition which is nearly always present in these cases.

"Case II. Mrs. B. K. D., thirty-two. Two children, younger six years. Illness began during second pregnancy. One miscarriage and curettement three years ago. Anemic, neurasthenic and utterly incapacitated for her duties as housekeeper. Spends most of time in bed and never gets up before noon. Menstrual flow profuse. Constant pain over right ovary and uterus. Uterus rather low, subinvolved, retroverted, and adherent to rectum. Right ovary prolapsed, somewhat enlarged and tender. Several Boston and New York surgeons have advised ventro-fixation and their advice would have been followed had not the patient been bitterly opposed to operation. Commenced mercurio-cataphoric treatment August, 1903. Pain entirely relieved after four treatments. Pain had always been aggravated by coughing, but after fourth treatment patient contracted whooping-cough and, though her paroxysms were severe, had no pain and because of this trouble

and for personal reasons she omitted treatments for five months, when she again reported at the office and at this time pain had not returned and general health was improved. July 25, 1904, after twenty-three treatments, menstrual flow was normal, examination showed uterus freely movable, normal size and good position, ovaries normal. General condition first-class and domestic and social duties are easily attended to. Discharged, cured.

"Case III. M. L. I., twenty-six, unmarried. As a result of injury had partially prolapsed uterus, cystocele and dysuria, constant sharp pain over ovarian region on both sides, and yellow leucorrhea. Eight treatments, cataphoric and high-tension, resulted in entire relief of pain and uterus being lifted to normal position. Has since married and had normal pregnancy and no return of pain.

"Case IV. C. D. G., widow, no children. Pale and 'run down.' General atony of vagina which presents pale appearance. Cervix just inside labia minora. Treatment, cataphoric and static, with mechanical vibration in lumbar region. Twelve treatments in all, with great improvement in both local and general condition. Last treatment May, 1904. Patient since married and happily, she reports.

"Case V. Mrs. G. K. F., thirty-four. Not well since birth of child ten years ago. Appendix removed and curetted two years ago. Excessive amount of flowing each month, saturating 35 to 40 napkins. After each menstrual period great prostration due to loss of blood, so patient is about for only two weeks each month. Is too fat and suffers from chronic constipation, relieved only by use of salines. Frontal headache. Uterus subinvolved and low. Treatment: Intra-vaginal, mercuric cataphoresis, and mechanical vibration. First menstruation after commencing treatment showed no change in amount of flow. Second menstruation flow reduced about one-half, with corresponding relief in amount of prostration. Still under treatment, but very irregular in attendance. Fourteen treatments to date. Feel sure of complete cure.

"Case VI. Mrs. K. I. T., twenty-six. Left ovary and appendix removed three years ago. Two miscarriages at six and two months respectively, the last occurring about a year ago and followed by curettement. Profuse painless menstruation. Intermittent pain over site of removed ovary. Anemic and shows general neurasthenic condition. Uterus large and boggy. Small lump in left ovarian region. Right ovary somewhat enlarged, low and tender. Thirteen treatments, same as in preceding cases, resulted in complete symptomatic cure."

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

"X-rays in the Diagnosis and Treatment of Pulmonary Tuberculosis." The Clinique, Emil Grubbe, M. D.

This is probably one of the most interesting papers that have been written to the present time on the X-ray in the treatment of tuberculosis. He goes into minute details in treating of the value of the X-ray in the early diagnosis of the disease, and shows conclusively to the unbiased mind that the X-ray, either by fluoroscopic examination, or by the radiograph, will demonstrate tubercular involvements accurately and definitely. He claims that, by radiography, tubercles and tubercular consolidation can be discovered and definitely located earlier than by any other means of diagnosis. In the primary and earlier stages, he depends entirely upon the radiograph, as it is permanent and much more positive than the fluoroscopic examination, while in the later cases, the fluoroscope reveals the lesions, without difficulty. He also calls attention to the way in which cavities can be demonstrated by means of the radiograph, also the difference between a cavity filled with air and one filled with pus. The first appear almost circular with a dense ring around it, while the latter appears as a dense circular space. Edematous regions appear as large clearly outlined spaces, having a heavy ring indicative of dense formation. He also calls attention to the restricted movements of the diaphragm. He points out that this restricted movement is one of the first symptoms discernible in tuberculosis, and is a very valuable sign to base the diagnosis upon. He notes also the comparative distance between the ribs, which, in tuberculosis, are found to be very close together.

While he considers the X-ray to be the most important single procedure in the diagnosis of tuberculosis, he thinks it should always be accompanied and its demonstrations verified by the regular physical methods of examination.

His requirements, for making good chest pictures, are (1) rapid exposure; to avoid movement of ribs and diaphragm. (He secures the plate to his patients by means of a wide roller bandage.) (2) A low vacuum tube which gives greatest contrast. (3) Slow development with weak solutions. (4) Thorough fixing and clearing. He lays special stress on the clearing of the plate, and claims that it takes as long to clear a plate after it is fixed as it does to fix it. He divides his cases for treatment into (1) acute cases, with loss of appetite, weight and strength, slight rise of temperature, et cetera. (2) cases, in which the above symptoms are present, but in an aggravated way, and (3) cases more or less characteristic, but which have become chronic, and progress more slowly.

X-rays are indicated in all forms and stages of the disease,

and are particularly valuable in the first and third class. He believes that the correct application of the rays is very essential, together with common sense in the management of the cases. His method is as follows: He exposes his unilateral cases, back and front, at each sitting, and treats daily from 8 to 20 minutes, according to the generator used and condition of the individual patient. He considers the general X-ray factors, (1) especially the tube, very important matters in the treatment. He uses a tube, which backs up a spark gap of from three to five inches. (2) He prefers a universal, automatic regulating tube. (3) The luminous hemisphere of the tube should be placed about six inches from the body. (4) He employs a subdued light in the tube. (5) No series spark gap should be placed in the circuit. He considers very little protection necessary as he wants the cervical, axillary and mesentery glands to have the benefit of the ray. No clothing is removed unless it is the lady's corset. Special attention should be given to the general management of the patient. Medicines, diet, hygienic and sanitary science should be drawn on as needed in the management of these cases. He does not believe in forced feeding of his patients, but lays great stress upon the digestion of what is eaten, and especially opposes the excessive use of fats. Next to diet he considers it very important to have pure air, but the patient should not be exposed or fatigued to obtain it. He uses ozone to prevent reinfection when cavities have healed. He lays great stress upon the inhalation of ozone, and considers it a most important adjunct to X-rays in the treatment of pulmonary tuberculosis. He reports one case only in this paper, in which the result was all that could be desired.

STATIC ELECTRICITY.

EDITED BY J. H. BURCH, M. D., BALDWINVILLE, N. Y.

The Therapeutic Uses of Static Electricity.

In a communication presented before the California Homeopathic State Medical Society and published in the Pacific Coast Journal of Homeopathy, Dr. Lilla M. Tenny of Oakland, Cal., reports a series of cases successfully treated by means of electro-static modalities.

The first group of cases were treated by means of the vacuum-tube discharge. The vacuum tube is connected direct with the negative side of the static machine, the positive side being grounded. The vacuum tube is applied directly to the part to be treated, care being taken that the contact is perfect. The spark-gap, that is closed to about one-fourth of an inch at the beginning of the séance, is gradually opened to the

tolerance of the patient. The patient may or need not be insulated. The duration of the séance is usually ten minutes.

A case of hay fever associated with asthma was cured in three treatments on consecutive days, with no further return during the entire season. A long-existing and offensive post-nasal catarrh was cured after several weeks' treatment. At first the applications were made daily for a period of a week in each nasal cavity and every other day thereafter for a period of three weeks.

A most violent case of traumatic conjunctivitis accompanied with severe pain and lachrymation was entirely relieved in one treatment.

Two cases of gonorrheal urethritis and vulvitis were most successfully treated by this method. The vacuum tube was applied directly to the vaginal mucous membrane. The condition of one of these patients was aggravated for the time being, by treating her just before her menstrual period. Dr. Tenny warns others against this procedure.

Internal hemorrhoids were likewise successfully treated by means of the rectal vacuum tube.

A large furuncle was dissipated by two treatments in one day.

A tubercular gland was treated daily for a month with no apparent improvement.

By means of the brush discharge and general electrification two cases of chorea made rapid improvement.

The brush discharge in connection with sparks is successfully used by Dr. Tenny in the treatment of rheumatoid arthritis and myalgia.

The static-induced is largely made use of in the treatment of chronic constipation and uterine displacements. The patient need not be insulated for this treatment, but may lie on a couch or table. A large abdominal electrode made of heavy tinfoil is connected to either pole of the machine, while the other pole is attached to an electrode inserted in the rectum. The duration of the séance is ten minutes, followed by a ten minutes' application of the brush discharge over the abdomen and spine.

A case of antiflexed uterus accompanied by chronic constipation, acid dyspepsia, and cystitis was cured in six weeks by means of this treatment.

Another case of ten years' standing of retroflexed uterus, packed low in the hollow of the sacrum, received daily treatments by means of the static-induced current. In two weeks the uterus was elevated so that the examining finger in the rectum could scarcely reach the fundus.

This treatment has proved so satisfactory that Dr. Tenny has largely given up the use of tampons.

For its constitutional effect the Morton wave-current is at

times employed after the completion of the séance with the static-induced modality. A large abdominal electrode of flexible metal is attached to the positive side of the static machine, the negative side being grounded.

In giving treatments with the electrode in the rectum, the valuable advice is given never to leave the patient, as gas is liable to form about the electrode, causing excruciating pain. Should such an accident occur the electrode should be removed at once, or the current reduced.

Great importance is placed upon "bridging" or the application of the modality employed sufficiently frequent to prevent recurrence of the morbid condition to be overcome.

PSYCHO-THERAPY.

EDITED BY LESLIE MEACHAM, M. D.

Cure of the Drink Habit by Suggestion? John D. Quackenbos, M. D., The Medical Brief.

"The drink habit is singularly amenable to hypnotic suggestion. In fact, some of the popular cures are in reality mere suggestion cures, there being no specific virtue in the drugs administered. Dipsomaniacs, as a rule, are easy subjects, in that they yield readily to hypnotic influence, and accept unconditionally the suggestions communicated by the operator." He urges that regular drunkards should be treated just before the close of the period of sobriety, as that is usually marked by irritability, depression, abnormal restlessness. The line of suggestions is outlined in full by the author, and the necessity of the co-operation of the patient insisted upon. When not willing, they should be frightened into it, by depicting the awful physical and mental consequences." . . . "Under these circumstances, it is comparatively easy to persuade the patient to accept treatment, and a rescue may be effected in a week's time." He asserts that of some hundred cases treated during three years, cures have been effected in eighty per cent.

[Sufficient distinction does not seem to be made between dipsomania and simple chronic alcoholism. The prognosis in the former condition is as distinctly bad as it is good in the latter. The statistics given and the ease of treatment are very surprising to careful and conscientious observers. Branwell gives but 28 cures out of 76 cases treated, though many others were improved, and the treatment was extended over months. The effects of suggestions in dipsomaniacs are less lasting than in any other class of patients.—ED.]

Dr. C. Lloyd Tuckey, in the St. Louis Medical Review, offers some interesting remarks on his experience in fifteen years' use

of hypnotism. He cites cures of kleptomania, criminals, nail-biting, masturbation, dipsomania, chronic alcoholism, and drink habits. Of two hundred cases of all forms of inebriety, he reports about forty per cent. of cures. He also urges it as an adjuvant in the treatment of neurasthenia, for the relief of insomnia, headache, depression, etc. Unconsciousness is not necessary. Other conditions relieved have been chronic articular rheumatism, with pain and edema of the joints, coccygodynia, climacteric flushing, various forms of dyspepsia, constipation, and migraine.

TRANSLATIONS.

EDITED BY AMÉDÉE GRANGER, M. D.

The Treatment of Hypertrophy of the Prostate by the X-rays.

Drs. Charles Luraschi and C. Carabelli. Translations, Congrès International de Physiothérapie, Liège, 1905.

In the two cases reported the diagnosis was carefully made. In both there was residual urine. One case was cured by fifteen radiations, the other by ten. Both were seen one year afterwards, and they were in the same satisfactory condition as when the treatment was discontinued.

They employed this technique. The patient in the dorsal position with his thighs flexed upon the abdomen is brought well to the edge of the table. The head of the latter is lowered in order to bring the perineum up. The scrotum and penis are pulled up and protected by a sheet of lead; the thighs, inguinal and anal regions are likewise protected. The tube is placed at a distance of 20-25 centimeters, and the prostate is rayed through the perineum for from 7-10 minutes. The exposures are made at first three times a week, later every fifteen days.

They close with these conclusions:

(1) The rays must have a special favorable action upon prostatic hypertrophy in the first stage, i. e., when there is only glandular hypertrophy, and before the fibrous changes have taken place.

(2) Another favorable action of the rays is upon the symptom of pain, which is invariably relieved after the first applications.

(3) Although their experiment was crowned with success, and the cures have lasted over a year, they do not offer their results as conclusive; but reserve the right to continue their experiments and make further reports.

(4) In spite of the fact that they believe that hypertrophy of the prostate should be treated with the X-rays before resorting to surgical intervention, they do not think that the knife and other therapeutic measures should be totally excluded.

The Regeneration of Barium Platino-Cyanide Screens. Professor Bordier. Translations, Congrès International de Physiothérapie, Liège, 1905.

It is known since the experiments of Villard that barium platino-cyanide, when exposed for a certain length of time to the X-rays, gradually loses its color and fluorescence: its color passes from the light green to the orange, and finally to the dull gold. It is also known that Saboureaud and Noire have recently made use of this property to measure the quantity of X-rays absorbed during a treatment.

The results of numerous experiments performed by the Author prove that the change in color of the barium salt is due to desiccation resulting in the water of crystallization being driven off. Even when the discoloration is very deep, and all the fluorescence is lost, the salt can be restored to its normal condition by being exposed in a damp atmosphere. This regeneration is hastened if we add the action of light to that of moisture.

Unfortunately for the physician, the barium platino-cyanide in which he is vitally interested is imbedded in and coated with collodion, which prevents the moisture from reaching it.

When screens or fluoroscopes are lightly discolored short exposures to light will restore their color, care being taken not to permit heat rays to reach them at the same time, as that would only aggravate the trouble by causing greater desiccation; but when the discoloration is deep and fluorescence is lost, the only means left is to break up the screen into very small pieces in some dish. Upon these hot water should be poured. The barium platino-cyanide readily goes into solution, and when this is evaporated the barium platino-cyanide crystallizes in its former condition with color and fluorescence restored. He expresses the hope that manufacturers will in the near future find a practical method of making screens, etc., without imbedding this salt and coating it with impervious material.

Dr. Bordier made a very satisfactory and practical screen in the following manner: A heavy piece of blotting paper was soaked in a saturated solution of barium platino-cyanide. The salt crystallized on both sides of the paper, and when this was separated in two, two screens were obtained, one side of which was covered with a heavy coat of barium platino-cyanide crystals. This side was protected by a glass plate. With those screens the regeneration was rapidly accomplished, even when fluorescence was lost, by wetting the side of the blotting paper screen opposite to the one which was coated with the Barium salt.

Blue Light Bath: Its Analgesic Action. Dr. E. Albert Weil. Translations, Congrès International de Physiothérapie, Liège, 1905.

It is recognized to-day that the effects of luminous baths,

whether general or local, are very different from those of vapor baths.

The combination of calorific and luminous radiations emitted by various sources, produce different effects according to the proportion of heat radiations and the quality of the light radiations. At the present time there are six varieties of light bath—general and local—the incandescent light bath, white, blue and red; the plain arc-light bath, or transmitted through a blue or red glass.

Each variety of light bath has its special indications. In his present communication the author wishes to especially emphasize the profound analgesic action—general and local—of the luminous baths from blue incandescent lamps. He asserts that exposure to this light placed in a mirror reflecting shade, if repeated often enough, will cure the worst types of neuralgias, rheumatismal pains, cramps; therefore, he concludes that the local blue incandescent light bath is a sedative of the highest order in localized affections.

He recommends on the other hand the general blue incandescent light bath carefully regulated, in all cases of general and varied pains, all the rheumatics, and in a large number of neurasthenics, in a word in all the hyperexcitables.

A Case of Paralysis Agitans Markedly Improved by the Electric Treatment. Drs. E. Doumer and Daniel Maes. Translations, Congrès International de Physiothérapie, Liège, 1905.

The patient, who was 72 years old, presented besides the cardinal symptoms, i.e., tremor of the upper extremities, the mask-like expression, the characteristic attitude, a marked arterial hypertention. No cardiac lesion could be discovered by auscultation. The digestive and respiratory apparatuses were normal. The urine was free from albumen and sugar. Urination was at times painful, at other times there was incontinence.

It was the arterial hypertention and congestive rushes to the head which especially attracted the attention of the authors. Accordingly the treatment was based upon this circulatory trouble, and the patient placed in the auto-conduction cage (high frequency currents) for five minutes daily.

After one month's treatment, the circulation became regular, the high arterial tension was diminished, the tremor and trouble of micturition had disappeared. The rigidity was less pronounced and the speech easier. A month later the general health of the patient was very good, and the treatment was discontinued.

They note especially the following:

(1) The coexistence in the same patient of an arterial hypertention and of a typical paralysis agitans.

(2) The disappearance of the motor symptoms when the arterial hypertention was made to disappear.

SOCIETY MEETINGS.

THE FIFTEENTH ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

THIRD DAY, THURSDAY, SEPTEMBER 25, 1905.

EXECUTIVE SESSION, 9.30 A. M.; THE PRESIDENT, DR. EMIL
HEUEL, IN THE CHAIR.

(Continued from p. 58.)

Dr. Eaton: I want to mention a matter of importance to the society. We meet once a year, and have most interesting and instructive meetings from which we derive great enjoyment and benefit. But during the rest of the year what we get from each other is merely what we get from our magazine. It seems to me it would be a great point if there could be established different district associations for the doctors in the neighborhood who could have meetings monthly or quarterly. I would, therefore, introduce a resolution "that the formation of state or district societies of the Association meet with the approval of the Association."

President: We have in this city already a sub-society—so-called—of which Dr. Brinkmann is the president, and we have also meetings.

Dr. Brinkmann:—This subject has been threshed out at various meetings of the Executive Council, and also in interviews with the President during the year just elapsed. We decided at that time not to take official cognizance of what we did in the local society. It was intended to bring the matter up at this meeting, and am glad that we have now an opportunity to vote upon it. I believe there is a great deal of value in associations of that character, and I have great pleasure in seconding Dr. Eaton's motion. (Carried.)

Dr. Goelet: I rise to make a few remarks in order to express my pleasure in being with you and one of you again. I have a great many friends among you, and I thank you for the warm reception you have given me. I regret I cannot stay with you any longer, as I have to deliver a lecture elsewhere this afternoon.

President: We will now resume the Scientific Session.

A paper was read by Dr. Francis B. Bishop, of Washington, D. C., on *Sciatica*, and discussed by Drs. White, Brinkmann, Dickson, Strong, Nunn, Snow, Johnston, Massey, Tousey and closed by Dr. Bishop. A paper by Dr. W. Benham Snow, of

New York, on the Action and Therapeutics of the Static Spark. A paper by Morris W. Brinkmann, M. D., on Synchronous Multiple-Pitch Vibration with Induction Currents.

THIRD DAY, THURSDAY, SEPTEMBER 25, 1905. AFTERNOON SESSION.

EXECUTIVE SESSION.

President: Before resuming the Scientific Session, I would like to present in Executive Session Dr. Carl Gies, of Vienna, whose name has been before the Executive Council and duly approved as an active fellow. Dr. Gies is with us, and I am about to introduce him to you. He is a graduate of Vienna, comes duly accredited and also has a letter of introduction.

Dr. Baer: I move that the Secretary cast the ballot of the Association for his unanimous election. (Seconded and carried.)

The Secretary has cast the ballot and he was declared elected. The application for Associate Fellowship, of Frank A. Sweet, Boston, recommended by Dr. Files and indorsed by Dr. White, was presented, and he was duly elected.

President: The place of next meeting is the thing in order for consideration.

Dr. Stover: Several invitations have been received; one from Detroit from the Convention Bureau of the Board of Commerce; another from Buffalo from the Bureau of Invention and Industry of the Chamber of Commerce; the Chicago Commercial Association sends another. It is not desired to make definite recommendations, but rather to have the subject discussed by members who are also free to make other propositions.

A full discussion of the advantages of the various invitations having taken place, and several other propositions having been submitted, Dr. Massey made a strong appeal for Philadelphia.

Dr. Brinkmann: I cast my vote for Philadelphia. I know the city and believe you can count upon a large meeting, and a successful meeting. I make a motion that Philadelphia be selected. (Seconded.)

President: You have heard all the propositions, and their respective advantages and disadvantages. It has been duly moved and seconded that Philadelphia be chosen. What is your pleasure?

Dr. Baer: I call for a rising vote.

President: Very well. Those in favor of Philadelphia will kindly rise and the Secretary count the number. There are twenty-six in favor. Those opposed, none.

President: It is the unanimous decision of the Association that Philadelphia shall be our next place of meeting.

Dr. Eaton: I have been asked by some members whether I would introduce the following resolution:

"That this Association accepts the principle in Electro-Physics as declared by the Committee at the meeting of the World's Electrical Congress in 1904."

Dr. Brinkmann: I move that that be referred to the Committee on Static Machines and Condensers.

Dr. Baer: I second Dr. Brinkmann's motion. (Carried.)

Dr. Brinkmann: We have not yet decided the date of the next meeting.

President: It has been the custom to meet on the second, third or fourth Tuesday in the month of September.

Dr. Dickson: I move that the question as to the date of the next meeting be left to the Executive Council.

(Some further discussion having taken place, it was moved, seconded and carried that the next meeting shall take place on the 18th, 19th and 20th of September, 1906.)

Dr. Gustavus Werber, Washington, D. C.: I want to bring in a proposition to change Section 15 of the Constitution which reads: "The nomination of all officers shall come before the Association instead of through a Committee on Nominations, at the business meeting, and the election shall be by ballot at that meeting, the result being determined by a majority vote of those present and voting. This amendment to read as follows:

"The nominations of all officers shall be made to the Association by individual Fellows at the business session on the second morning of the Annual Meeting, and the election shall be by ballot at that meeting, the result being determined by a majority vote of those present and voting. And further that the by-laws and Section 15 be changed to conform with the provisions of this amendment."

Dr. Margaret A. Cleaves read a paper on Conservative Gynecology: Its Relation to the Continuous Current. Discussed by Drs. Massey, Baer, Phelps and closed by Dr. Cleaves.

Dr. Henry Finkelppearl read a paper on The Electric Light in the Treatment of Syphilis. Discussed by Drs. Cleaves and Phelps. Dr. Brinkmann in the chair.

Dr. G. H. Stover, Denver, Colo., read a paper on Successes and Failures in Roentgen Therapy of Epithelioma of the Lip. Discussed by Drs. Tousey, Willis and Eaton.

The President having resumed the chair said: Owing to the lateness of the hour I will suggest that the remaining papers be read by title. One is a very long paper entitled "The Association of the Various Physical Agents in Rational Therapy" by Professor Carlo Colombo, Rome; and the other is on "The X-ray Treatment of Epithelioma" by Dr. John Nesbit Scott, Kansas City, Mo. On motion the papers were read by title.

(To be concluded.)

BOOK REVIEWS.

TRANSACTIONS OF THE INTERNATIONAL ELECTRICAL CONGRESS, St. Louis, 1904. In Three Volumes Published under the Care of the General Secretary and Treasurer. J. B. Lyon Co., Printers and Binders, Albany, N. Y., 1905. Price, cloth, \$5.00 net.

This valuable contribution to electrical literature contains the papers and transactions of one of the greatest Electrical Congresses in the history of the science. Vol. 1 is devoted to the Organization and Proceedings of the Congress with the Transactions of the Sections of General Theory and General Applications. Vol. 2 is devoted to the Sections in Electro-Chemistry, Electric Power Transmission, Electrical Light and Distribution, and Vol. 3 to the Sections of Electric Transportation, Electric Communication and Electro-therapeutics. The work as a whole comprises upward of 2,500 pages, is neatly bound, and a valuable addition to the library of any one interested in electrical science. The volumes may be procured in leather binding at a slight extra cost. The section devoted to Electro-therapeutics contains valuable contributions from leading American and European authorities. Many of these articles are of exceptional merit and value to the profession. It is probable that no work of so much value to electrical science can be procured for so small an investment as these transactions. The management are to be congratulated upon the able manner in which they have been edited, and the attractive appearance of the volumes.

MODERN THERAPEUTICS. Fourth Revised Edition, Adapted to the New (1905) Pharmacopeia. A Text-Book on Modern Materia Medica and Therapeutics. By A. A. STEVENS, A. M. M. D., Lecturer on Physical Diagnosis, University of Pennsylvania; Professor of Pathology, Woman's Medical College of Philadelphia. Fourth Edition, Revised. Octavo of 670 pages. Philadelphia and London: W. B. Saunders & Co., 1905. Cloth, \$3.50 net.

In this, the Fourth Edition, the author has thoroughly revised and adapted the work to the recent revision of the U. S. Pharmacopeia. New articles have been added dealing with Scopolamin, Ethyl-Chlorid, Theocin, Veronal and Radium; and in the section on Radiotherapy much new matter has been added. Part I of the work is devoted to Materia Medica, classifying drugs according to the usual manner and followed by the consideration of remedies other than drugs. The author in his consideration of electricity treats the subject very briefly, and does not seem to appreciate its general value in therapeutics. The writer says "whether the good achieved by electricity, especially by franklinism in functional nervous diseases, is to be attributed to the specific action of the electricity itself or whether it is to be regarded as wholly the work of suggestion is a subject on which opinion is divided. It can not be denied, however, that in some of these cases, at least, the benefit derived is the result rather of psychological than of physiological effects." The writer might as well have reversed the statement

as probably no agent to-day is more active in the relief of acute and chronic inflammatory processes so often the actual cause of these neuroses in which the psychology plays the smallest rôle, and might add the remarkable effects upon general metabolism. Massage, Movement Therapy for Locomotor Ataxia and the Schoot or Nauheim Treatment, the Therapeutic Uses of Cold and Heat, Hypodermoclysis and Infusion, Enteroclysis, Lavage of the Stomach, Blood-letting, Antinotherapy, Roentgen Ray Therapy, the Uses of Radium and Lumbar Puncture are very briefly considered. Section II is devoted to Applied Therapeutics. The work is full and complete and scientifically in accord with the popular therapeutics of the present time, but it may be truly predicted that in future works devoted to therapeutics more attention will be given to the more efficient and energetic employment of Physical Therapy. The publishers are to be congratulated on the excellent quality of workmanship, and the author upon the generally accurate and scientific manner in which he has prepared the work.

A TEXT-BOOK OF PRACTICAL THERAPEUTICS. WITH ESPECIAL REFERENCE TO THE APPLICATION OF REMEDIAL MEASURES TO DISEASE AND THEIR EMPLOYMENT UPON A RATIONAL BASIS. By HOBART AMORY HARE, M.D., B. Sc., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia; Physician to the Jefferson Medical Hospital; One-time Clinical Professor of Diseases of Children in the University of Pennsylvania; Laureate of the Royal Academy of Medicine in Belgium, of the Medical Society of London; Member of the Committee of Revision of the United States Pharmacopoeia of 1905. Eleventh Edition, enlarged, thoroughly revised and largely re-written. Illustrated with 113 engravings and 4 colored plates. Lea Brothers & Co., Philadelphia and New York, 1905. Price, \$4.00 net.

This, the eleventh edition of this valuable work, is written in accordance with the new U. S. Pharmacopoeia, of which the writer was a collaborator. In this New Pharmacopoeia changes in the preparations both by exclusion and addition as well as changes in strength, render necessary the publication of new editions of works of this kind. The writer has adhered where changes in nomenclature have taken place to the older name at the heading of the article, and gives the new name under, to avoid annoyance. Throughout the work where drugs or diseases are considered, titles are arranged alphabetically according to the name commonly employed, rendering the work a ready reference book. The writer has also added the preparations of the British Pharmacopoeia, also a dose list of drugs both official and unofficial. It has pleased the writer to omit the subject of medical electricity, and wisely, as he justly considers that "electro-therapeutics" has outgrown any work except those devoted to that subject alone. A copious and explanatory arrangement of diseases and remedies has been appended. In Part I the writer considers the General Therapeutic Considerations; in Part II, Drugs, and in Part III, Remedial Measures Other than Drugs and Feeding the Sick; while Part IV is devoted to Treatment of Diseases, Table of Doses

of Medicines, Index of Drugs, and Remedial Measures. The work is well illustrated and published in the usual excellent style and type of workmanship of the publishers, and in its general features will commend itself to the student of therapeutics.

SAUNDERS' QUESTION COMPEND NO. 7, ESSENTIALS OF MATERIA MEDICA, THERAPEUTICS AND PRESCRIPTION WRITING, arranged in the form of questions and answers prepared especially for students of Medicine. By **HENRY MORRIS, M. D.**, Fellow of the College of Physicians of Philadelphia; Associate Member of the Association of Military Surgeons of the United States. Seventh Edition, thoroughly Revised and Adapted to the eighth revision (1905), of the United States Pharmacopeia by **W. A. BASTEDO, Ph. G., M. D.**, Instructor in Materia Medica and Pharmacology at Columbia University (College of Physicians and Surgeons), New York; Assistant Attending Physician to the Roosevelt Hospital Dispensary and to the Vanderbilt Clinic. Philadelphia and London: W. B. Saunders & Co., 1905. Price, Cloth \$1.00 net.

This work is one of Saunders' Question Compend in question and answer form, and is calculated to be one of the most complete published. It is the seventh edition, which is a testimonial as to its former reception. In the present work the definitions, nomenclature and official prescriptions conform with those of the Eighth Decennial Revision of the U. S. Pharmacopeia, which became the official standard on September 1, 1905. As a work that will be useful to the student and practitioner, it is complete in itself, but not designed to take the place of the larger text-books on materia medica. The binding and workmanship of the book are attractive and arrangement convenient for ready reference.

NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

A NEW LIGHT BATH CABINET.

The light bath cabinet shown in the accompanying cut is constructed to meet the growing demand for the administration of radiant light energy.

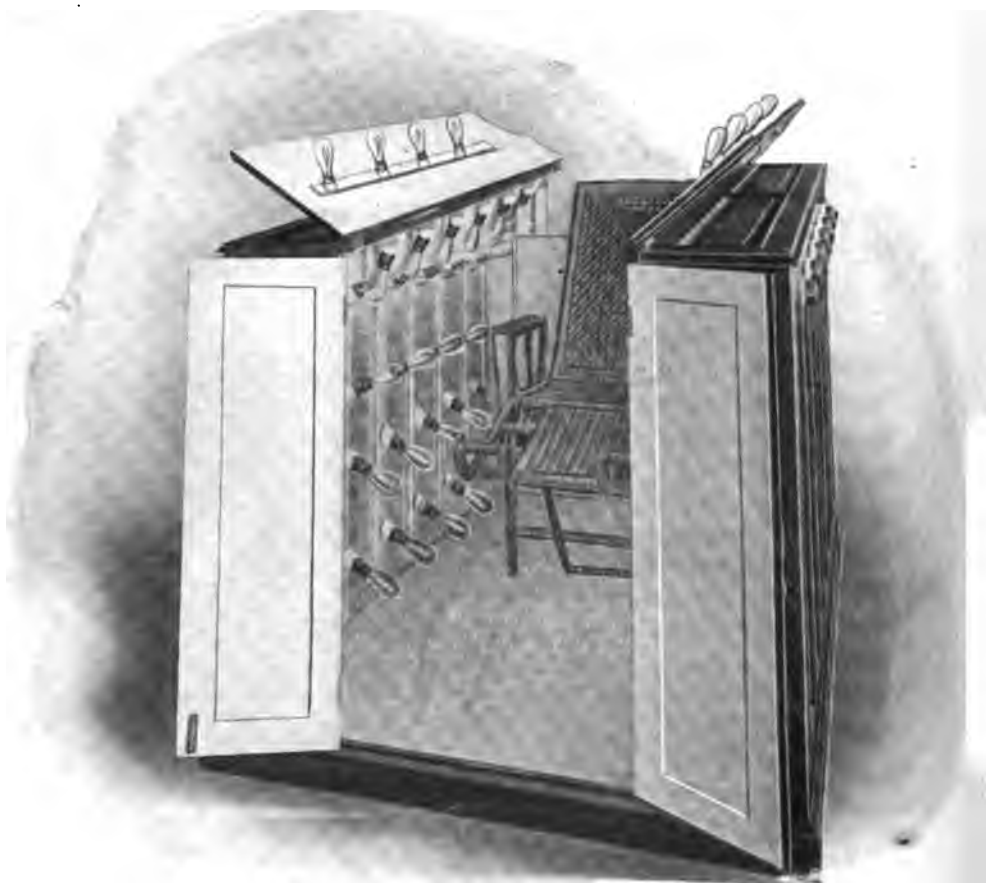
In other bath cabinets the disadvantage of requiring the patient to sit in an upright position, under which conditions attacks of syncope are apt to occur, has been overcome by constructing the cabinet of such proportions that the patient may recline on a comfortable chair during the administration.

It is provided with sixty sixteen candle power, incandescent lights with provisions whereby rows of lights may be turned on at the will of the operator. (Larger power lamps can be substituted when higher temperature or greater light intensities are required.)

The temperature within the cabinet may be regulated by the number of lights employed, it being possible to raise the temperature to 150° F. during the first few moments of the ad-

ministration when the lights are all turned on. With doors opening at one end and over the top of the cabinet, the patient enters without difficulty.

The cabinet is provided with a folding chair, rendering it



possible to place the patient in different positions, with the head within or outside.

It is constructed of thoroughly seasoned quartered oak with paneled sides and doors, and white enameled on the inner surface. The workmanship and material are in every way superior. The cabinet is so constructed that it can be readily taken apart for shipment.

The bath cabinet is manufactured and for sale by E. B. Meyrowitz, 104 East Twenty-third street, New York.

The Journal of **Advanced Therapeutics**

VOL. XXIV.

MARCH, 1906.

No. 3.

SUCCESES AND FAILURES IN ROENTGEN THERAPY OF EPITHELIOMA OF THE LIP.*

G. H. STOVER, M. D., DENVER, COL.

Lecturer on Electro-Therapeutics and Radiology, Denver-Gross Medical College, Radiologist to Saint Joseph's and the City and County Hospitals, Denver.

Like the rest of the early operators with the Roentgen ray, I did not suspect I was dealing with an agent that had such effects upon human tissues, until I was unfortunately given a demonstration of the fact, some time in 1897, upon my own hands—a demonstration that is still too apparent for comfort. I am glad so few of us have lost limb or life. While we appreciate highly the work of the martyrs we can no more feel sympathy for the ignorant or careless Roentgenologist who burns himself. These accidents served to show us that we were handling a force that did more than to illuminate the hidden recesses of the human body. From this beginning the science of Roentgen therapy has increased with rapid strides, until it has grown to be so broad a subject that one cannot, in the time permitted by a society programme, cover satisfactorily more than a part of a single branch.

In some of the cases I shall report to you I am fortified in the diagnosis by microscopic examination, but in most of them such an examination has not been made. As practically all my work is with referred cases, a diagnosis has usually been made before the patient comes to me, by one or more physicians. It would be interesting and of scientific value if microscopic examinations could be made in all cases, but many patients object, either to the operation or procuring a specimen or to the expense incurred; I will not sponge on the time of a pathologist, and I am not able to pay for all these things myself, therefore I must do the best I can.

* Read at the Fifteenth Annual Meeting of the American Electro-Therapeutic Association at the New York Academy of Medicine, September 22, 1905.

Roentgen therapy is not applicable to all epitheliomata of the lip. If there is a large tumor mass and its appearance is such that extension of infection is imminent it is probably best to employ surgical measures at once. In cases in which the original lesion is not so threatening, yet with enlarged or indurated glands in the neighborhood, a thorough surgical operation should probably be advised, though I must say that Cases Nos. 2 (gland in axilla), 94, 179, and 216, which will be spoken of more fully at the end of this paper, are such as may possibly lead me to modify this position in future, as they apparently show that the ray has a destructive effect upon the carcinomatous process in glands.

It has seemed to me that the use of fluorescin, as suggested by Morton, is a useful procedure, and I imagine that my results have been somewhat better since I began its use, but the cases are not yet old enough to report.

The border-line cases, meaning those in which it is somewhat of a debatable question whether to use the Roentgen ray or to advise surgical intervention, may be treated for a time in the hope of avoiding an operation, with the risks attendant upon all administrations of anesthetics, and with a possible or probable resulting disfigurement. At the present time there are operations which enable a safe amount of tissue to be removed, yet with a minimum of disfigurement. The best of all, I think, is the operation devised by Dr. W. W. Grant of Denver, whose method, even in the presence of very extensive disease, leaves a remarkably good cosmetic result. If favorable action by the Roentgen ray is not soon manifest in these border-line cases, they should be submitted to operation; the preliminary raying will not have done harm, but will have been of benefit.

Those cases in which the disease is superficial, not great in extent, and in which there is no glandular involvement should certainly receive the Roentgen ray, and a recovery may be confidently expected in a very large majority of them—in fact, I am almost tempted to say in all. To say that recovery is to be expected does not mean to me that it may be predicted to the patient. I do not think I ever definitely promised a cure of anything. It is better to promise little and perform much, than to promise much and perform little. Recoveries are so very many in this category, the patient recovering without scarring,

having a lower lip that he can control, and that does not render speech indistinct, that we are here justified in regarding Roentgen therapy as being better for the patient than surgery, and so advising those who consult us.

I do not as yet feel able to express an opinion regarding the value of post-operative raying as a prophylactic against recurrence; it seems to be a rational procedure. If the lip has been excised and a recurrence appears, I would certainly use the ray very patiently before advising another resort to surgery.

If an operation has been done, and some hitherto undiscovered or uninvolved glands show involvement later, I am not willing to advise that they be not removed, yet there is good evidence in favor of the use of the ray upon them, as I have already mentioned.

With regard to the technique I employ, I will say that I have used a variety of apparatus to excite the Crookes tubes—Kinraide coils, Carstarphen coils of six-, twelve-, and fifteen-inch spark length, Meyer eight-inch coil, Heinze twelve-inch coil, Scheidel twelve- and sixteen-inch coils, and static machine. I prefer tubes of the automatic regulating type. With all my treatment tubes I use Friedlander shields, not only to protect myself and my assistant, but also to limit the action of the ray, keeping it from other parts remote from the seat of the disease. I do not, however, limit the ray strictly to the diseased area, but believe it is well for the surrounding tissues within a reasonable distance to be acted upon. Probably all lymphatic glands in the vicinity should be thoroughly treated. I wish I had done this more in the past.

Applications are usually made three times a week, with an average exposure time of ten minutes, never more than fifteen, and extremely seldom are they ever made as long as that; the distance of the tube from the skin is about ten inches. I do not care to expose more often or longer than this, because I think this plan gives me a better control of reaction.

I use a ray of good quantity, not deeply penetrating; for superficial work; the vacuum of the tube would be rather low for skiagraphy of the hand.

I do not as yet use measuring apparatus, in an attempt to measure the quantity of Roentgen energy that is being used; knowing the voltage and amperage does not tell us the amount

of output from the secondary, and knowing this latter would give no information as to the ray output of a tube; the ray production of two tubes, actuated by the same source of electrical energy would vary very much if the tubes were not of the same age, if their walls were of different thickness, or if they were made of different glass material. A combination of the methods of Benoist and of Saboraud would be good for approximate measurements, but as so much of the change in color in platino-cyanide of barium seems to be due to dehydration, this factor would cause the apparatus of Saboraud to give widely different readings in different climates; in Colorado, for example, platino-cyanide of barium deteriorates very rapidly. With experience, knowledge of individual coils, tubes, etc., the expert operator can very closely estimate the quantity of energy he is sending into the tissues, and the amateur has no business with the Roentgen ray.

I use no local application as a routine in the treatment of epithelioma. It has seemed to me that it is rather an advantage than otherwise for a crust to form on the surface of an epithelioma; when it is shed we usually find that matters have been progressing very well beneath it.

I do not aim to produce a dermatitis, but if an erythema appears, I accept it as evidence that full action is taking place, and usually lessen the frequency of the applications.

I have formed the opinion, from my experience with it, that the Roentgen ray is of the greatest value in the treatment of many cases of epithelioma of the lip.

We must have more statistics as to recurrence after Roentgen therapy, but in the absence of such statistics, I am under the impression that they are less often met with than after operation.

The following cases I hope will serve to illustrate some of the statements I have made, and I also hope they will suggest some points for discussion which I may not have brought out.

Case No. 94. Referred by Dr. J. M. Blaine. C. D. B., male, twenty-five years of age. Family history, negative. Pipe and cigar smoker. In 1891 noticed a small spot like a cold sore on lip; later some induration appeared; paste was applied; induration reappeared; this occurred several times. Roentgen therapy began in October, 1903. Twenty-seven exposures made without much change, and I asked for a micro-

scopic examination; the surgeon removed the indurated area, but lost the specimen. The induration returned and I made some more applications of the ray. In March, 1904, I insisted that the induration be removed, and also some glands which had become involved. This was done and the pathologist reported that the glands were very malignant. More raying was then given; in a few weeks it was evident that new glands were indurated. These were rayed for about two months, when I asked to have them removed and examined. Dr. Wilder reported that while these glands also contained many epithelial cells, they were nearly all degenerated and would hardly take the stain. A number of prophylactic treatments were then given. Up to the time of writing this paper, over fifteen months since the last operation, there has been no sign of a return of the disease.

Case No. 2. Referred by Dr. E. J. A. Rogers. Miss N. J., aged thirty-five. This was a case, not of epithelioma of the lip, but of Paget's disease of the nipple with carcinoma; I report this case here because there was an indurated gland between the axilla and the pectoralis major muscle. This gland entirely disappeared during the successful treatment of the disease.

Case No. 179. Referred by Dr. Leonard Freeman, H. I., male, aged about forty-seven. This patient, with epithelioma of the cheek, had some Roentgen therapy, but as he lived out of the city, decided to be operated upon to save time. Shortly after the operation several glands showed involvement, and they were thoroughly rayed for a time. One induration entirely disappeared and two others became smaller, but as some more were discovered down in the neck where the ray had not been applied, it was decided to operate again. I consented to this so as to get a microscopic examination of the glands on which I had been working. The epithelial cells in these glands were but few and were markedly degenerated. One gland had almost no epithelial cells in it and its structure had been almost replaced by fibrous tissue.

Case No. 56. Referred by Dr. P. V. Carlin. P. A. P., male, aged eighty-one years. Family history, negative. In 1889 face was burned by the fall of a lamp. Some time after this, suffered a severe frostbite. In 1891 an epithelioma began to develop. In June, 1903, the diseased area was three-fourths

inch long, as wide as the thickness of the lip, and a typical induration. There was no involvement of glands. Twenty-nine exposures were given, resulting in recovery. At this time, after over two years, the lip is absolutely normal, without even a scar.

Case No. 63. Referred by Dr. C. B. Van Zant. W. F. McC., male, aged sixty-four. Fourteen months previous to consulting me a triangle had been removed from his lower lip on account of epithelioma. In twelve months a recurrence appeared, and when I saw him the diseased area was three-fourths inch long, about one-fourth inch wide with induration. No glandular affection manifest. Eighteen exposures were made and treatment discontinued, as the patient had to leave on business, which was permitted, as he was nearly well. At this time, two years after, there is no sign of further trouble, and the lip is of normal appearance.

Case No. 46. C. P. R., male, aged sixty-two. Family history, negative. Lip has been sore for several years; three months ago the present sore appeared. Induration and some ulceration; occasional stinging pain. Thirty-eight Roentgen exposures were given, and up to this time, two and one-half years after, there has been no recurrence.

Case No. 150. Dr. M., aged about fifty. Small epithelioma with some induration, but without glandular involvement. Only eight exposures were made, and the doctor stopped coming because improvement was so great. At this time, over a year and a half after, there is no sign of there having been any trouble in the lip.

Case No. 29. Referred by Dr. P. V. Carlin. P. S., male, aged forty-one. Sore covered by a crust, indurated, and about one-half inch in diameter, without involvement of glands. Occasional stinging pain. Eighteen exposures were given, resulting in apparent recovery. I learn while writing this paper that there has been no return of the trouble, after two and one-half years.

Case No. 87. W. H. E., aged fifty-seven years. Family history, negative. Pipe smoker for many years, always carrying pipe on left side. In 1891 noticed scaling of left side of lower lip, and later a warty growth appeared. Caustic was applied several times; a gland under the chin became involved; the growth took in nearly the whole width of the lower lip and ex-

tended down the cutaneous surface toward the chin. The lip was indurated and there were five large warty-looking lumps



Case No. 87.

on the ulcerating surface of the growth; there was a discharge with the characteristic odor. As the patient would not listen



Case No. 42.

to talk of surgery I consented to treat him for a month; during that time some of the lumps on the surface came off and

the swollen gland under the chin seemed to become smaller; during the next month the induration in the lip became less and the discharge and odor disappeared; during the third month, my notes state that an operation ought to be done, but patient refuses and insists on continuing the ray treatment. During the fourth month, December, 1903, I obtained some radium and used it, but without favorable effect. From this time on my notes show that I frequently urged operation, but



Case No. 143.

it was always declined, until April, 1904, when I declined positively to do any more, as he was getting worse. He was then operated on by Dr. W. W. Grant. It was certainly as unfavorable looking and difficult a case as ever presented itself to a surgeon. You may judge of this and of the result obtained, from the photographs which I offer for inspection. After the operation a number of exposures were made as a prophylactic measure; no recurrence took place in the lip, but a gland on the left side of the neck became involved.

Case 42. Mrs. A., Italian woman aged about forty-five years. She had been given Roentgen treatment by another party, and was said to have been nearly well; she was sent for

by this party and when she came to his office he made an incision into the lip, for what reason I know not, and made another series of exposures, but she became rapidly worse; when she came to me there was a large mass involving the whole lower lip; after eleven exposures the daughter who came with her to my office took sick, and as the woman could not find her way about alone, she got no treatment for three months; when



Case No. 93.

she did return her condition was pitiable; the mass had grown to a length of about four inches and was over an inch in diameter, with a horrible odor; at their earnest request I gave a few treatments and then declined to continue.

Case No. 143. Referred by Dr. —. H. T., aged forty-five years. Family history, negative. Cigarette smoker for twenty-nine years, always holding cigarette in right side of mouth. Whiskey drinker and politician. A year before he came to me there appeared a sore on the lower lip near the right corner of the mouth. When I saw him it was half an inch long, as wide as the thickness of the lip; it frequently crusted over and was accompanied by induration. He had been applying caustic to it for some time. I could feel no glands. After several months' treatment the sore seemed to

be improving slowly (he persisted in going about town and drinking), but a couple of glands could be felt in the neck below the chin, and I then insisted that he be operated upon. Dr. Leonard Freeman removed a part of the lower lip and the infected glands, the result of the operation being very satisfactory, and at this time, a year later, there are hardly any traces of the operation, saving of course the scar in the lines of incision, and these are hardly noticeable. A number of exposures were given after the operation, and as yet there has been no sign of recurrence.

Case No. 93, W. B. M., aged about sixty, stockman. About five years before coming to me a small crust began to appear at times on the lower lip; after a time induration appeared and later an ulceration began. I found an indurated mass in the lower lip about three-fourth inch by one-half inch in length, the surface ulcerated. The patient was a man of very



Case No. 370.

heavy build, florid skin, dilated vessels everywhere in it, one of those who, while apparently very robust, yet strike the observer as having tissues very much below the standard of health. He received the Roentgen ray only, as this was before fluorescin was used. After over five mouths of treatment the induration had nearly disappeared, and it seemed as if the ulcerated surface, now very small, would heal in a short time; there was a slight discharge from the center, apparently coming from the remains of the skin gland in which the disease arose. I told him to stop treatment for two weeks, using peroxide of hydrogen to clean up the discharge. He did not appear again until seven weeks had elapsed; then the disease had become worse, the tumor mass larger again, and there

was an indurated gland under the chin in the neck. I refused to treat him any further, and fairly dragged him to the surgeon for operation. This was done in May, 1904, and I gave a number of prophylactic exposures soon after. Up to the present time there has been no recurrence.



Case No. 310, after operation.

Case No. 310 illustrated herewith shows one of Dr. Grant's patients before and after operation. This patient received a few prophylactic exposures after the operation.

1443 Glenarm St.

Discussion.

Dr. Tousey: Dr. Stover has met with the same experience as others who have treated epithelioma of the lips. The cases which are distinctly favorable will yield to the treatment with the Roentgen ray, but in cases of long standing no favorable results can be expected. The general experience has been that the X-ray has not proved very suitable for the cure of epithelioma of the lip.

Dr. Willis: I have had a case, male, 58 years old, a great pipe smoker, who had a scab on his lip, and also the gums bleeding some time last winter. He came to the office and had one treatment with the X-ray, and in less than three weeks all trouble had stopped and has not since reappeared. Presumably it was a commencing epithelioma.

Dr. Eaton: I would ask the doctor if in these cases he has used any other treatment except the X-ray.

Dr. Stover: I did not try any other form of electricity. When the lesions extended deeply, my successes have been limited.

AN INTENSIMETRIC SCALE FOR X-RAY DOSAGE.*

BY SINCLAIR TOUSEY, A. M., M. D., NEW YORK,

Surgeon to St. Bartholomew's Clinic.

In discussing the therapeutic use of the Roentgen ray I would like to present the briefest possible résumé of an unpublished article of mine upon one of the elements of X-ray dosage. In it I propose the adoption of an intensimetric scale for X-ray tubes based upon the distance at which visible fluorescence is produced in the ordinary box fluoroscope with a barium platino-cyanide screen. The distance is measured in meters (for this purpose practically equivalent to yards), and the X-ray is said to be of an intensity of "8 (Tousey)" when this distance is 8 meters.

In measuring the distance the eyes should be allowed some seconds to become accustomed to the obscurity of the fluoroscope box and then the X-ray should be turned on in short flashes of about 2 seconds with intervals of 15 seconds. As the observer moves toward or away from the tube a heavy metal object like a bell is moved before the fluoroscope in order to determine the greatest distance at which one can be positive that he sees the motion of this object. This does not mean that its outline must be clearly defined. Of course, in applying this test of the intensity of the X-ray it is necessary either to have a fluoroscope of the usual brilliancy or else to know what allowance to make for lack of brilliancy. The figures used to express the intensity should refer to the ordinary conditions of office work; not, for instance, to a test made when the observer's pupils had been widely dilated by ten minutes' rest in a dark-room. The record of a treatment by means of this scale might read:

Penetration 6 (Benoist); Intensity 7 (Tousey);
Distance 30 cm.; Exposure 2 minutes.

(The other details of the numbers of amperes in the primary current, the equivalent spark-gap, the model of the tube,

* Read before the Fifteenth Annual Meeting of the American Electro-Therapeutic Association at the Academy of Medicine, New York, September 18, 1905.

whether a spark-gap or a ventril tube is used, the number of milliamperes in the secondary current, the interrupter, the rheostat, and the large or small self-induction in the primary winding; all these should be preserved in every case for the operator's own use. And they would be useful to anyone with an identical apparatus.)

The intensity of the source varies as the square of the distances at which equal illumination is produced. So that in employing this scale if one wishes to produce the same effect as in the recorded exposure: (1) the current may be regulated so as to produce the recorded intensity and the time and distance be made the same; (2) the time of exposure may be varied in inverse proportion to the square of the intensimetric number; or, (3) as the author prefers in some cases, the distance from the anticathode to the surface of the body may be varied directly in proportion to the intensimetric number.

Thus if the recorded application were:

Penetration 6 (Benoist); Intensity 7 (Tousey);

Distance 30 cm.; Exposure 2 minutes,

either of the following applications would produce the same effect:

(1) The current could be regulated to produce intensity 7 (Tousey) and the vacuum and other conditions be regulated to produce a penetration of 6 (Benoist), the distance being 30 cm., the exposure 2 minutes. The formula would be exactly as in the recorded application: Penetration 6 (Benoist); Intensity 7 (Tousey); Distance 30 cm.; Exposure 2 minutes.

(2) Intensity 12 (Tousey); Penetration 6 (Benoist); Distance 30 cm.; Exposure 42 seconds. (Whatever the intensity the time would be varied accordingly if the distance remains the same.)

(3) Intensity 12 (Tousey); Penetration 6 (Benoist); Distance 50 cm.; Exposure 2 minutes. (Whatever the intensity the distance would be varied accordingly if the duration of exposure remains the same.)

The relation between this system of dosage and Holzknecht's units will be studied in my article; and also the experiments which have made me believe that the scale forms an accurate guide to the effect produced; as well as the difficulty and imperfection of the methods heretofore employed.

Discussion.

Dr. Morton: I desire to compliment Dr. Tousey on his extremely ingenious method and the scientific spirit he has shown in devising an intensimetric scale for measuring X-ray dosages. The advantage of his method over previous attempts in this direction lies, of course, in the more stable value. I have nothing further to add, but would like to try his method one day, and if I find that it answers the expectations which the author would have us entertain regarding it, I will be glad to put it into practice.

Dr. Johnston: I would like to say, speaking of changes in fluorescence, that very careful experiments have been made in this respect, and it has been shown that the change in color and fluorescence after exposure to the X-ray is due to a chemical dehydration, and that the exposure of the fluorescent screen to moisture will rehydrate it. It regains its original color and practically the same brilliancy.

In all attempts at measurements of X-ray dosages one important thing ought never to be overlooked, and that is the personal equation. Even in Dr. Tousey's very ingenious method the personal element is of the first importance. There is the constant change in the fluorescence of the screen, and then the personal factor in the appreciation of the fluorescence.

I wish the doctor would devise a means by which without danger to himself he can measure the intensity. I have devised such a means in the shape of a fluoroscope that can be used without the slightest danger to the examiner.



STATIC ELECTRICITY.

BY JOHN H. BURCH, M. D., BALDWINVILLE, N. Y.

Member of the American Electro-Therapeutic Association, First International Congress of Physical Therapeutics, Syracuse Academy of Medicine, Onondaga County Medical Society, etc.

Although frictional electricity was the first form of electrical energy to be utilized in medicine, it was the last to receive its deserved recognition as a therapeutic agent. This would appear strange from the fact that the early workers in this field of research grasped with marvelous accuracy the efficacy of this agent. They also deduced with remarkable precision from clinical results the physiological effects of high-potential electrical currents. The classical observations of Manduyt, Cavallo, and Adams stand unique. In fact, the more modern methods of precision have added but little to the results achieved by these early workers. The lower voltage continuous current discovered by Galvani, and later the induced current of Faraday, displaced for a time the frictional machine, not so much from the greater efficiency of the former as from the fact of its being more portable, less expensive, and new. From this early period of popularity little seems to have been known of Franklinic electricity until Charcot revived its use at the Salpêtrière, from whence Dr. W. J. Morton became interested in its possibilities.

In the year 1881 Morton's first communication appeared in the Medical Record of April 2, 9, and 13. In this remarkable memoir the static-induced current was first described and the possibilities of oscillating currents of high potential and frequency were suggested as therapeutic agents. Dr. Morton's second communication appeared in the year 1899 describing the Morton wave-current. In 1897 Monnell published the first edition of "Static Electricity in X-Ray and Therapeutic Uses." This valuable work did much to stimulate an interest in the static machine as a therapeutic agent. The very valuable early communications of Dr. William Benham Snow; his first monogram, "Electro-Static Modes of Application, Therapeutics, Radiography, and Radiotherapy"; and his recent publication, "Currents of High Potential, of High and

Other Frequencies," have placed electro-static modalities upon a firm and scientific basis.

The physical properties of high-potential electrical currents have been accurately worked out. The therapeutic indications of electro-static modalities are fairly well established. The physiological effects, however, are presumed rather than proven from clinical results. So far as I can learn, the only accurate laboratory research work published in regard to the physiological effects of the various modalities derived from the static machine are the observations of Maitre and Florence of Montpellier. Their work consisted of a series of accurate urinary examinations that demonstrated that these currents affect metabolism by increasing the amount of urea excreted.

Notwithstanding the fact that the therapeutic indications for the various Franklinic currents are apparently pretty thoroughly defined, it seemed feasible that still greater results might be achieved were the physiological effects of these various modalities better understood. In 1902, in connection with my student Mr. George Shaw, I began a series of experimental research work in regard to the comparative physiological effects of electrical currents of high potential and frequency. The result of these studies was presented at the St. Louis meeting of the American Electro-Therapeutic Association. This experimental work seemed to prove that while spark discharges from a coil or resonator actuated by this source of energy is less potent in its effects upon photographic plates and micro-organisms, it was found that upon living animals the effects of the electrical discharges from both the coil and static machine were identical in regard to time and appearance. It was also shown that the static machine possesses an advantage in regard to quiet discharges, from the fact that it is a continuous current generator having distinct polar effects, as was demonstrated by means of our experiments upon blood pressure.

It was also found that the effects of d'Arsonvalization, the direct application of the high-frequency current, and the Morton wave-current were identical in regard to their action upon metabolism, as was demonstrated by careful urinary examinations.

This series of experiments convinced me at the time that the physiological and therapeutic effects of these forms of elec-

trical energy are almost wholly the result of potential. The static machine was found to possess distinct polar effects that were apparently of considerable therapeutic value, from the fact that the clinician may utilize with accuracy a modality capable of combating specific morbid conditions, without resorting to the unsatisfactory methods of pure empiricism in each case presented. The clinical application of the deductions from our experimental work with quiet electrical discharges has convinced me that we may, in fact, prescribe with precision these modalities. I have therefore come to look upon the sphygmomanometer as essential to the physical therapist as is the fever thermometer to the general clinician.

In conducting the above referred to experiments fifteen healthy subjects were selected and divided into groups of five. A series of preliminary tests were instituted for the purpose of determining as near as possible the normal arterial tension. The Cook modification of the Revi Rochi sphygmomanometer was employed with, unfortunately, the two-inch armlet. For this reason the readings are higher than they would have been had a wider armlet been employed. By means of these preliminary tests the psychical influence of the procedure was eliminated to a great extent, and we were enabled to approximate the normal blood pressure of each subject.

Twenty experiments were made with the Morton wave-current. Of this number, ten applications were made by piling a bundle of journals upon a foot-plate that was connected with the positive side of the static machine, the negative side being grounded. The subject sat upon the insulated platform with his feet upon the journals. The spark-gap was from eight to ten inches. A Holtz machine was employed with ten revolving plates of thirty inches in diameter, run at a speed of 420 revolutions per minute. The duration of each séance was fifteen minutes. Of these ten applications there was in eight instances a rise of arterial tension averaging 10 mm. In the remaining two there was a slight fall of 2 mm. in one and 3 mm. in the other. The remaining ten applications were made by means of a long spinal electrode of malleable metal placed over the entire length of the spinal column and attached by a flexible rheophore to the positive side of the static machine, the negative side being grounded. The speed of the machine and the length of the spark-gap were the same as in the other

experiments. The duration of the séance was also fifteen minutes. Of these ten applications there was a rise of arterial tension in nine averaging 10 mm., while in the remaining one there was a fall of 1 mm.

I observed a very peculiar phenomenon in connection with this modality. In the treatment of a case of arterio-sclerosis with interstitial nephritis, the blood pressure registered at the beginning of the treatment 250 mm. After a séance by means of a metallic electrode, as above described, there was a fall of 15 mm. I later made a large number of tests among patients suffering from interstitial inflammation of the kidney with high arterial tension, and found in every instance a marked fall of the blood pressure. In the treatment of two cases of parenchymatous nephritis by means of this current I observed the same phenomenon, only in these cases there was not an abnormally high tension.

During the past year I have treated two cases of parenchymatous and one of interstitial nephritis. In each of these cases there was an unusually high arterial tension. In one of the parenchymatous cases the average was 240 mm. and the other 210 mm. There were also albumen, granular casts, cast-off epithelial and red blood cells. The case of interstitial nephritis presented an average blood pressure of 280 mm. There was well-marked arterial sclerosis and traces of albumen. These cases have been under observation for nearly a year and have received treatments at regular intervals by means of the Morton wave-current. I have made twenty-five blood pressure observations in each case, both before and after treatment. In one of the cases of parenchymatous nephritis there was an average fall of tension of 8 1-2 mm. after a séance of twenty minutes' duration by means of the Morton wave-current, the number of observations being twenty. The same number of observations also revealed an increase of the amount of urea excreted averaging .02 of 1 per cent. In the other case of parenchymatous nephritis the average fall of blood pressure was 7 1-4 mm. and the increase of urea .01 of 1 per cent. In the case of interstitial nephritis there were twenty-five observations made with the result that there was an average fall of arterial tension equal to 12 1-2 mm. after each treatment of twenty minutes' duration by means of the Morton wave-current. There was also an average increase of .05 of

1 per cent. in the output of urea excreted. These cases were treated by means of a long spinal electrode of malleable metal, placed over the entire length of the spinal column and attached to the positive side of the static machine, the negative side being grounded. In all of these cases the amount of albumen was decreased while the patients were under observation. In each case, however, both the blood pressure rose to its former height, the amount of urea decreased, and the albumen again appeared after discontinuing the treatments for a period of from two to three weeks. At the present time I can see no permanent improvement in any of these cases.

(To be concluded)



DIRECTIONS FOR THE TREATMENT OF PULMONARY PHTHISIS BY THE USE OF CONCENTRATED OZONE AND A CARRIER TOGETHER WITH SUPERFEEDING WITH SOLUBLE PROTEIDS.

BY HOLFORD WALKER, M. D., TORONTO.

Before giving directions for the use of this method that the experience of the past five years has demonstrated to be the most advanced in use, I deem it advisable to explain the principles aimed at and quote A. S. Ramage of Detroit, to whom the credit is due of promulgating this combined form of treatment in 1901. Before that time I had used the inhalation of ozone from static machines with marked results, but at once recognized the advantages of this combined treatment, realizing we had at our disposal forces which are very far-reaching in their effect and theoretically ought to prove curative in phthisis. Facts and results during the past five years in my experience, and also in that of others, have proved the correctness in every detail of this theory, and while I do not claim it is a so-called "consumption cure," I do claim that it has proved itself to be the most advanced and scientifically correct method extant for treating phthisis at the present day. To quote:

"The principles aimed at are as follows: First, the destruction of the micro-organisms and the toxins formed by them. Second, the building up of the tissues by giving the patient

superabundance of tissue-forming material in the form of soluble proteids which are entirely free from toxic bases. Also soluble natural carbohydrates to supply the energy necessary to the system."

"First: as to the destruction of the micro-organisms, etc., it has been known for some time that this can be done if the patient can be kept in an atmosphere containing a large quantity of ozone, but unfortunately this has hitherto been practically impossible, owing to the intense irritation to the mucous membranes, very similar in effect to that caused by chlorine gas. However, on passing ozone through cineol, the active constituent of oil of eucalyptus globulus, heated to 60° C. 145° F.) dense white fumes of a new compound are formed, giving a very volatile liquid of a strongly camphoraceous odor on condensation. Upon breathing the fumes of this compound (named camphoric superoxide) from three to five minutes, it is then possible to breathe ozone in any quantity without irritation. This is no doubt due to the fact that the membranes become coated with the camphoric superoxide which at once decomposes in the presence of the moist tissue, liberating cineol and passing active oxygen into the tissues: the cineol again taking up ozone, generated in the room of the patient, forming peroxide and then recombining, so acting as a carrier for the ozone. In this way it is possible to pass into the lung tissues active oxygen in quantity. The primary effect on the patient is a reduction of abnormal temperature and a very palpable increase of vitality. That the toxins and micro-organisms are decomposed in the presence of ozone or active oxygen is an assured fact, and does not need further comment."

"Second: as to the building up of the tissues by giving the patient a superabundance of tissue-forming material, etc. The object aimed at is to obtain absorption of a superabundance of proteids, and in order to do this it is necessary to have them in a soluble state and in a condition that can be assimilated without the use of the digestive system. That this has been the aim of physiological chemists for a very long time is evidenced by the fact of the innumerable soluble proteids upon the market." . . .

The most practical method of feeding has been demonstrated to be that of the whey feeding in Switzerland and also recom-

mended by Dr. Osler, late of the Johns Hopkins. The objection to whey feeding is that there is only one per cent. of proteid in the whey; namely, lactalbumin. We all know the effect on hogs fed on the whey which is a waste product at all cheese factories. It is the lactalbumin and milk sugar alone in the whey that causes the increase of size and weight.

The lactalbumin is the pure natural soluble proteid contained in milk in which it exists to the amount of one-half of one per cent.; with the exception that when the cow calves the colostrum then contains sixteen per cent., diminishing on the eighth day to one-half of one per cent., at which time the calf can take care of itself. This is an infallible rule throughout the entire mammalia, human milk containing three times as much lactalbumin as cow's milk. This law of the larger increased amounts of lactalbumin throughout the mammalia in order to feed their offspring, which only have a rudimentary digestive system, is the natural law to apply to a tuberculosis patient whose system is always deranged and therefore in a similar condition as regards work as that of a newborn babe. Lactalbumin does not decompose and can be taken in any quantities.

Particular attention should be paid to the fact that the system can assimilate five times the requisite amount of soluble proteid needed to keep up nitrogen equilibrium. In other words, if we take the physiological law that the system will assimilate ten times in grains the body weight in pounds, or in other words, if a patient weighs 150 pounds, it is necessary for that patient to assimilate 1500 grains per twenty-four hours to keep up nitrogen equilibrium, and yet by the use of soluble proteids, it is perfectly possible for that system to assimilate 7500 grains of proteid. Any further excess than this is passed off in the excreta of urine. By this means we give the patient a superabundance of tissue-forming material, while keeping the bacilli destroyed and enabling the patient to throw off the disease.

During the last five years experience has shown that not only is the assimilation of proteids weak in tuberculosis but also the assimilation of the carbohydrates, and that it is necessary to give in addition to the soluble proteids, soluble carbohydrates, otherwise the system feeds for its energy upon the proteids. In

actual practice it has been found that as in the cases of the newborn infant, the natural carbohydrate, milk sugar, supplies the energy requisite.

As regards the method that has been adopted in producing the ozone in the bedroom of the patient, it will be best understood by a glance at the illustration herewith, a box wherein

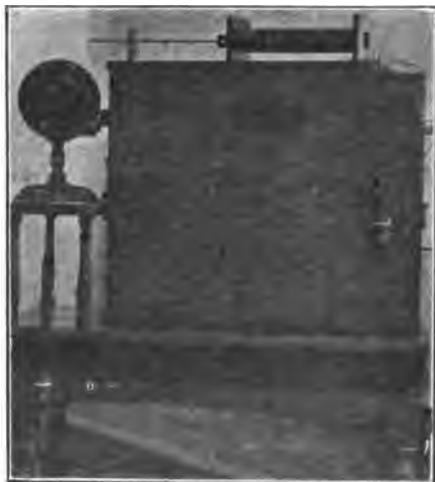


Fig. 1.

the electric current is transformed from a 110-volt alternating current, a fan to blow the ozone into the room, and a most important feature of the process a current controller in order to regulate the quantity of the ozone, as each stage of the disease requires, "experience teaches," a different strength and further the current strength varies during the day from the city wires.

The current is turned into the apparatus for from five to thirty minutes according to the size of the room, and the stage of the disease, and the susceptibility of the patient; the patient previously having inhaled from a very fine atomizer the camphoric superoxide from three to five minutes as deeply as possible, having first learned abdominal breathing, which causes little or no fatigue.

The patient remains in the closed-up room charged with ozone for one hour; recharging the room for five minutes

during the hour is often called for. Deep abdominal breathing is practiced a portion of the hour at first, and later on during the whole time. The treatment is repeated three or four times daily, thoroughly ventilating the room between times. At bedtime, which must be early, the room is heavily charged with ozone and closed up for the night, except in very hot summer nights when the windows may be opened an hour after, to be closed and recharged again in the very early morning hours. In the early treatment a bronchitis is generally set up "and with benefit" in the diseased portion of the lungs, clearly defining the disease, in which event it is advisable to stop the ozone, "but continue the camphoric superoxide" inhalations. As soon as the bronchitis subsides, "usually in two to four days," resume the ozone, at first weak and gradually increase the strength; the patient to observe almost absolute rest for three or four weeks, but not necessarily confined to the bed. As regards diet, if the digestion is impaired, give pure lactalbumin, dessert- to table-spoonful every two hours, and if the gastric juice is deficient in acid, give muriatic acid.

As digestion and appetite improve, the patient may partake of simple plain diet, including honey and plenty of water, shortly before meals and at bedtime. Three to six ounces of lactalbumin are taken daily between meals, including one-half ounce at bedtime and also during the night, and again in the early morning. In three or four weeks the 50 per cent. lactalbumin and 50 per cent. of milk sugar may be substituted, taking 4 ounces to 6 ounces daily for three or four weeks and then gradually reduce, when the digestive organs will be found capable of digesting any quantity of ordinary substantial food. In early cases the disease will be found to be stayed in from two to three months, in more advanced cases from three to six.

Where practicable mechanical vibratory stimulation with a proper instrument will be found to greatly aid and shorten the duration of the necessary treatment. Later experience with light has also proved it to be a valuable aid in many indicated conditions. Flushing the colon three times a week with two quarts of warm water has proved beneficial in those of constipated habit. The mechanical vibration will relieve this condition. The patient gradually resumes gentle open-air exercise, avoiding fatigue.

INDUCTION AND SO-CALLED HIGH-FREQUENCY CURRENTS.

BY MONROE S. CLAWSON, E. E., NEW YORK.

As it is impossible for the physician to make a careful study of electro-physics and at the same time keep in touch with the many branches of his profession, he must of necessity depend to a great extent upon the qualifications and integrity of the manufacturer. Probably not one per cent. of the physicians are in a position to distinguish between the different currents which it is possible to generate from the several types of apparatus which have been placed upon the market. We note in the medical journals that certain makes of apparatus will generate currents of Oudin, d'Arsonval, and Tesla besides the oscillatory and static currents.

I wish to say at the outset that this is impossible from a single apparatus and is very misleading to the prospective buyer of an outfit.

In the first place the Oudin and d'Arsonval currents are all generated from a "make and break" continuous current, while the Tesla is generated from a true sine (alternating) current.

When an alternating current is passed through the primary of a transformer, although the potential or voltage and amperage are changed, the resulting current is that of a true sine wave while a transformer or induction coil is excited by a "make and break" continuous current, resulting in the generation of an oscillatory current which is directional in character.

The static current is not only generated in a different manner but it is different in character and cannot be reproduced by any transforming device.

It is also stated that the efficiency of the straight core transformer or, in other words, the standard induction coil is very much lower than the closed magnetic field transformer of Tesla. It has been demonstrated by electrical engineers in commercial lighting work that where the ratio of transformation is very much lower than on apparatus where high-potential currents are generated, there is only a difference of about 10 per cent. to 12 per cent., and that where higher ratios are used this difference in loss decreases. It can be clearly shown that

on any of the well-known makes of apparatus where 8 to 12 amperes are required to excite the transformer a proportional increase in output over apparatus which requires 1 to 3 amperes is the result.

In fact on any of the standard apparatus where mercury or mechanical interrupters are used the difference in efficiency amounts to nothing. It is admitted that with the electrolytic interrupter a larger amount of current or amperage is required to excite an apparatus; however, taking everything into account, it is more reliable, easier to replace, and much cheaper. It must be remembered that when a Tesla apparatus is delivering the same amount of energy a much larger motor converter is necessary and the operation of same is attended with a proportionately increased amount of care besides being very expensive.

In the next issue of *ADVANCED THERAPEUTICS* I shall try to illustrate the different methods of generating high-potential and so-called high-frequency currents.

The editors of medical journals would do well to refuse to insert matter and advertisements which tend to mislead, as they would patent medicine advertisements. I do not discuss nor question the therapeutic value of the current from any apparatus, but to advertise that a certain design generates all of the different currents, when it is absolutely impossible, leads me to believe that it is done purely for gain.



Editorial.

MISCONCEPTIONS CONCERNING EFFECTS OF ELECTRO-THERAPEUTIC APPARATUS.

IT has been too often said by manufacturers of high-frequency coil apparatus and their representatives that all of the static effects may be derived from such apparatus. This is not the case and the physician who is not well informed is deceived.

Why it is ever sought to make these statements unless the static currents are recognized as superior is difficult to understand; and this granted, the static machine should not be overlooked. Another bugaboo of which far too much is made, is the oft-repeated and much-exaggerated statement that the static machine is too susceptible to humidity to be of practical value. While true that the efficiency is lowered on a humid day, it is the rarest thing for a properly cared for static machine not to give satisfactory results. Operators who understand how to care for their machines are successful in their constant employment in the very humid climates of London and Honolulu. In the United States there is certainly no occasion for trouble if the operator understands how to care for the machine. Fresh c. p. sulphuric acid or enough quicklime in hard lumps inclosed in duck sacks or slatted boxes having numerous openings and covered with two thicknesses of the best unbleached muslin, so that the dust cannot get out, will effectually control the conditions. Chloride of calcium is ruinous to the static machine.

As a matter of fact there are distinct differences in the currents and other discharges of the static machine and coil high-frequency apparatus, and each has its field in therapeutics which should be well understood and defined, first of all by the medical fraternity. Manufacturers should then strive to create apparatus to meet requirements and not as has been done too often in the past, produce an apparatus for the profession to experiment with, and find out what it will or will not do.

The static effects, which are unique, and have not been, and probably will not be duplicated, are valuable mechanical effects by which mild or intense, otherwise painless tissue contractions can be induced, penetrating in character and applicable

over small or large areas and of a current strength never dangerous to the organism.

The numerous useful static modalities do not call here for consideration nor the large therapeutic field in which they are so eminently useful. In amperage only do the static currents fall short in electro-therapeutic scope, and in connection with resonators, it is possible to duplicate the effects of all coil apparatus. In point of amperage the modern twenty (revolving) plate machines are not deficient in therapeutic requirement.

One field the coil holds supreme—the difficult problems in radiography cannot be so well met with any other apparatus. On the other hand, for therapeutic uses the X-ray from the static machine is equal if not superior to the coil. The coil when employed with a properly constructed resonator, covers a very wide range of therapeutic indication and is a useful addition to the armamentarium of the physician who employs a static machine.

If manufacturers who are endeavoring to duplicate the effects of the static machines will devote their energies to producing excellent X-ray coils with resonators having the widest range in quantity and potential, every progressive physician will care to possess one.

On the other hand, it is far wiser for the physician not to purchase at first the largest static machine procurable, but one of moderate size, and a first-class coil apparatus, thereby covering the widest range of therapeutic possibility in two distinct apparatus.

* * *

THE OSTEOPATHIC BILL.

REASONS why the osteopathic bill should not become a law are patent to intelligent persons, lay or professional. No individual should occupy a position in the community by which he may assume the care of the sick, who is only trained in one therapy. The lives of the public are never safe in the hands of the man or woman who rides a hobby, physician or osteopath. The osteopath designates himself a "pathist." The osteopath is a man with a hobby, a hobby in which there is some merit, and with which he does not profess to cover the full scope

of diseases, but endeavors inconsistently to cure conditions to which other measures are better adapted.

So soon as the public are made to understand this truth, there will be no appeal to legislators, for the appeals will be useless, and the man who intends to take charge of the sick, will graduate first from a recognized school and then embrace not only manual methods but every other rational procedure according to indications. Osteopaths are constantly seeking instruction in the use of other physical agents, which, when injudiciously applied, are as dire in their consequences as dangerous drugs, and once recognized and admitted to practice would soon be everything but osteopaths, though unqualified.

The demand of the times is for the broad-minded physician, not the granting of recognition and the title of physician to the narrowest cult in existence.

The mania to treat the sick is a human weakness, and the number who would enter the field, if the way in were easy, are legion. The high standard of medical education makes the inclination of illiterate aspirants, strong toward any school in which the standards are low, as have been and still are the osteopathic schools. Legislators are generally too intelligent, if the case is put in the proper light, to give opportunity to a narrow school of thought, especially when it involves the health of the community.

* * *

NEW ENGLAND ELECTRO-THERAPEUTIC ASSOCIATION.

WE are pleased to announce the organization of the New England Electro-Therapeutic Association at the American House, Boston, Mass., on Feb. 9, 1906, by members of the American Electro-Therapeutic Association, and in accordance with the resolution passed at the last meeting of the Association.

The officers elected for the ensuing year are as follows: President, Fred. H. Morse, M. D., Boston; First Vice-President, F. B. Granger, M. D., Boston; Second Vice-President, I. G. Anthoine, M. D., Nashua, N. H.; Secretary, W. Winslow Eaton, M. D., Salem; Treasurer, N. L. Allen, M. D., Boston; Executive Council: C. F. Osman, M. D., Boston; C. O. Files, M. D., Portland, Me.; M. Reeves, M. D., Boston; F. F. Strong, M. D., Boston; F. H. Morse, M. D., Boston.

Progress in Physical Therapeutics.

CURRENTS OF HIGH FREQUENCY AND HIGH POTENTIAL.

EDITED BY WALTER H. WHITE, M. D.

Currents of High Frequency From a Static Machine. By Frederick De Kraft, M. D., New York and Philadelphia Med. Jour., September 30, 1905.

"If we connect two large Leyden jars to the prime conductors of a static machine by their inner coatings, approximate the sliding rode to within an inch or two, and connect the outer coatings by means of two wires whose distal ends are placed in water, then start the machine in action, we shall see a spark at the sliding rods, called the A spark by Lodge, and almost simultaneously a second spark B pass through the water. This A spark is a one-way spark of very high power, and, if emanating from a source of great power, is extremely dangerous.

The A spark is, however, easily stopped, as by a wet blotting paper placed across the gap; not so the noisy B spark, which passes through water, and even carbon does not stop it. This B spark is oscillating in character and devoid of danger. The discharge from a large Leyden jar of a powerful modern static machine may reach 100 and more amperes for an infinitesimal amount of time.

If we connect this oscillatory discharge from the B circuit to a spiral of stout copper wire, and have the A circuit fed by a static machine having at least twelve to sixteen revolving plates running at a high rate of speed, an oscillating current is set up in this spiral which possesses remarkable physiological powers.

This oscillating current, when passed through the body of a person, causes no sensation. If we connect one end of this solenoid to a platform, such as comes with modern Holtz machines, five and one-half feet long, on which we have placed two sheets of block tin, side by side, over which are thick pieces of felt, one above the other; then place our patient upon this and either place in each of his hands a metal handle, connected to the other end of the solenoid, or else connect a large, flat, moist, felt-covered electrode over his abdomen or chest, we have one plate of a condenser in the block tin and one plate in our patient's body; a true Leyden jar. The process is generally known as d'Arsonval auto-condensation.

To increase the output from the Holtz machine to the Leyden jars it is necessary to increase the difference in potential be-

tween the positive and negative side of the machine, otherwise our machine will be, in a measure, short-circuited, and we shall fail to procure an efficient current to work with

To this end I have had constructed a series spark-gap interrupter, which consists of a glass tube over which is placed, at equal distances, thirty brass rings. This is mounted on rubber and provided with a rod by means of which one or all gaps can be placed in circuit. This interrupter is placed in the circuit between the negative side of the machine and the negative Leyden jar. By this means I have been enabled to obtain a current of greater amperage, higher voltage, and altogether improved efficiency."

"Thus we can easily obtain a current for auto-condensation up to 650 or even 700 milliamperes, as measured by a Wappler hot wire meter." . . .

"We can thus combine general with local treatment. I have used this form of auto-condensation with success in cases of gonorrheal rheumatism, uric acid diathesis, phthisis pulmonalis, diabetes mellitus, and alcoholism. In obesity it accomplishes at times very quick reduction."

"The physiological effects of currents of high frequency may be summed up briefly, viz.: Increase in general nutrition; in the depth of the respiratory excursions; in the excretion of CO_2 ; in bodily temperature; in the activity of the sweat glands. The urea and uric acid excretion becomes normal."

"The current just described may be used by means of various vacuum electrodes, either on the surface or in various cavities of the body. I prefer to ground the positive side and connect the negative side to the glass vacuum electrode which I place in contact with the part." . . .

"In one case of traumatic synovitis of the knee of several months' standing two applications with glass vacuum electrodes reduced all swelling and banished every trace of pain. In this case the usual methods had been used previously and effected no relief. This method is useful in acute neuralgia, old indurations, enlarged lymphatics, rectal fissures, old indolent ulcers, ozena, etc." . . .

"By using a brass ball electrode we can draw long or short painless sparks from the body. Care should be taken not to bombard a part for too long a time or with too long sparks, lest a break of the skin occur or even an ugly ulcer form, which would be slow to heal. These sparks can be used for the destruction of warts, nevi, exuberant granulations, to stimulate old ulcers, old inflammatory indurations, gouty joints, etc.

"By using a glass vacuum electrode in connection with this current, a beautiful purplish light is produced, and, if held at some distance from the body, a gentle effluve, luminous in character, results, evolving a great quantity of ozone." . . .

"If we connect the series spark interrupter between the sliding poles of the machine and attach small Leyden jars to the prime conductors, ground the outer coat of the positive jar, which is on the negative side of the machine, and connect a vacuum tube to the outer coating of the negative Leyden jar, on the positive side of the machine, then set the machine in action and slowly open the spark-gaps one by one to the point of tolerance, holding the vacuum tube in the palm of the hand, we shall see the tube light up, muscular contractions running up the forearm and arm to the shoulder will be produced, the glass will heat up in a moment, and, if the current is strong, may become unbearably hot. This current can be measured by a hot wire ammeter, and may run up to 200, even 350 milliamperes. The larger the Leyden jar we employ the stronger the current, and the smaller the size of the jar the finer the oscillations and the weaker the current."

This current is useful in hemorrhoids and in removing indurations around rectal fistulas. It relieves the pain in post-hemiplegic spastic contracture. It is useful in varicose ulcers and varicose veins, in dilatation of the stomach. In constipation it answers a useful purpose. It can be applied by means of various vacuum electrodes to the cavities of the body. In uterine subinvolution, chronic metritis, etc., it works well.

The High-Frequency Spark in a Xanthoma-Like Degeneration of the Lips. C. W. Allen, M. D. Medical Record, September 23, 1905.

"In 1896 Dr. J. A. Fordyce called attention to this affection. . . . Until high-frequency came in vogue, there was no practical method of treatment known to me. . . . Several years ago I found in the high-frequency spark the most practical, and perhaps the least painful, prompt and satisfactory method of removing disfiguring xanthoma tumors from the neighborhood of the eyes. In two patients there was coincident xanthoma of the lids, which I cured with the spark. One was also a subject of lues. Indeed most of the patients so far treated have been syphilitic and in two I feel quite sure that the lip degenerative change began subsequent to their coming under mercurial treatment, but I do not wish to draw any conclusions from these facts. The condition undoubtedly exists in the whole series of members of a family in which there is no lues, no ingestion of mercury, and no xanthelasma. In applying the high-frequency spark I employ a static machine and a hyperstatic transformer, a large carbon electrode, a spark-gap of two inches, and a contact spark of about an eighth of an inch, or one which will cause almost at once a marked whitening of the surrounding pink of the lip. Two or three sittings usually suffice and the pain is trifling."

CONSTITUTIONAL DISEASES.

EDITED BY FRANCIS B. BISHOP, M. D.

Electro-Therapeutics.

In the December number of the Monthly Cyclopedia of Practical Medicine, appeared an article under the above caption, from the pen of Dr. John H. W. Rhein, Neurologist to the Howard and St. Agnes Hospital of Philadelphia. While we believe that the writer of this article intended to be eminently fair, in his treatment of the subject, his views, statements and conclusions are so at variance with the real facts as known and taught to-day, that we venture to make a few quotations, and express our views as they occur to us after an experience of twenty-five years in the application of electricity to the various diseased conditions of the human body.

He says: "The Faradic current does little more than act as an irritant, causing involuntary contraction of healthy muscles and excitation of sensory nerves, its irritative action produces also some vasomotor dilatation. The sinusoidal current has the same physiological qualities as the Faradic current, but has the advantage of producing little or no pain."

The sinusoidal current produces contraction by its action upon the protoplasm of the nerves and muscles, while the induced current acts only upon the peripheral nerves and other endings producing contraction by stimulation reflex in character. Hence we fail to induce contraction of the muscles by the induced current in motor nerve degeneration—while you may still get good contraction with each make and break of the sinusoidal current. Again as a matter of fact the induced current may produce decided sedation as well as irritation.

"The effects of electricity upon the brain is not great or important. When applied to the skull there are dizziness, nausea, pallor, and if the current be sufficiently strong, there is sometimes fainting."

These effects, on the contrary, are both great and important. and exert an influence upon the cerebral circulation through the action upon superior cervical sympathetic.

"In the opinion of the writer, the therapeutic value of electricity is somewhat restricted." On this point the writer and I thoroughly agree. But not so much restricted as any other therapeutic agent known and those restrictions are being gradually removed.

"In the early stages of a traumatic neuritis, the indifferent or negative electrode should be placed between the scapula or

over the sacrum and a small electrode attached to the positive pole of the galvanic battery should be applied to that part of the nerve which is diseased. The current should be small in amount, usually about 4 to 6 milliamperes being sufficient, and should be applied for five minutes."

Why he places the negative pole between the scapulas or over the sacrum, and uses a small positive electrode to the diseased nerve, the doctor knows best. That was the rule of the old masters, when they were picking their way along to the truth. My custom for many years has been to use large electrodes at both poles. The positive as nearly over the center of the diseased nerve as possible, with the negative at the seat of pain or injury, making a stabile application of a current suited to the comfort of the patient—often making applications for half an hour at a time, with most beautiful results.

"The value of electricity in the treatment of progressive muscular dystrophies is not very great."

As above stated, the therapeutic value of electricity is somewhat restricted. Oppenheim says in his valuable treatise, in speaking of progressive muscular dystrophy, "There is no doubt that congenital developmental anomalies of the muscular septum are the cause of this disease."

"In the treatment of palsies of spinal or cerebral origin, electricity plays a minor part, with the exception of acute poliomyelitis. In this disease, however, together with massage, it constitutes the principal and most important features of the treatment." If electricity plays a minor part in these cases—what plays the major part? Certainly not medicine, for there is nothing for medicine to do. But in many cases of cerebral and spinal palsey too, electricity after the acute stage, offers and accomplishes better results than any other twenty agents. I do not mean to say that it cures, for nothing can restore what has been destroyed, and this is often the case in spinal and cerebral palsies.

"In apoplexy, thrombosis and brain softening, electricity is of no value." The same answers as to the above.

"Nor is it to be used in myelitis or systemic spinal diseases." In the same paragraph he states, "The galvanic current, however sometimes helps the lancinating pains of this disease (locomotor ataxia), and temporarily relieves incontinence of urine if applied locally."

I have a case of chronic myelitis under treatment at present. The case is of several years' standing following a protracted

attack of typhoid fever. He is steadily improving. It cannot be said that he will get entirely well, but medicine has been used and other measures, including massage for nine years, without the slightest benefit, in fact he was growing worse. Electricity will often do more for locomotor ataxia than suggested by the writer. In many cases static electricity has permanently checked the progress of the disease and restored control of the bladder, always controlling the pains.

"Sciatica, especially the subacute forms, is greatly helped by the application of a stabile or labile galvanic current, the anode being stroked over the painful nerve, while the cathode is placed over the sacrum."

Sciatica is due to many causes, each case requiring its special treatment after the cause has been discovered and removed. In neuritis arising from trauma or pressure, toxemia, or infection, electricity in one form or another will cure, and in all other cases when an etiological factor can be found and eliminated. The purely congestive form will yield to several electrical methods.

"In facial neuralgia pains are often relieved temporarily and sometimes permanently by the skillful application of the stabile or labile galvanic current." We may say the same in this case, as in sciatica. He has seen "the pulse rate lowered from ten to twenty beats while treating the pneumogastric in exophthalmic goiter." The same thing, as a rule, occurs and when properly applied improves the general health and the patient gets well.

The writer treats hysteria and neurasthenia as though they were practically one condition—by the slowly interrupted "Faradic" current applied to the motor points of all the muscles, for from half to one hour at a time. He makes no mention as to the cause or kind of neurasthenia, or as to the temperament of the patient. Except that he states "hypochondriac neurasthenics are often helped by the application of the static breeze."

"The treatment of diseases of the thoracic and abdominal organs, does not often require the use of electricity."

Every physician familiar with the use of electricity knows that the writer is mistaken in this statement, as there is not an organ in the entire body that does not come within the legitimate application of electricity, when applied by those who use it constantly, study it, and apply it every day in a scientific manner.

A few other diseases are mentioned, and the paper concludes

with the statement, "With few exceptions, no disease, not mentioned above, can be vitally influenced by the application of any form of electricity described in the foregoing paragraph."

GYNECOLOGY AND METALLIC ELECTROLYSIS.

EDITED BY G. BETTON MASSEY, M. D.

Cataphoresis in Malignant Growths. By Dr. F. O. Marsh, Professor of Chemistry in the Miami Medical College, Cincinnati, Ohio, writes as follows in the Medical Brief, January, 1906:

The modern method of destroying malignant growths by means of cataphoresis is not to be confounded with the Apostoli method of treating fibroid tumors of the uterus. Cataphoresis, anaphoresis, or simply phoresis, are terms in medical and surgical parlance expressing what is known in the modern physics as the migration of ions, and signifying more than the older and more familiar term electrolysis. Electrolysis, pure and simple, means merely electric decomposition. Cataphoresis takes note of the attendant movement of the ions or electric units into which chemical compounds are decomposed, and their disposition in the medium surrounding the electrodes; their velocity of migration, etc., all have been studied to practical surgical account.

The full surgical use of cataphoresis, the writer is convinced, should not be confounded in value with the fashion in vogue some years ago of attempting to force drugs through the skin for general or local absorption by means of the constant current. Owing to the comparatively feeble currents used, there is every reason to believe that the results attained were more often imaginary than real. Often the results claimed were entirely visionary and founded on misconception. The idea of driving iodine, as such, through the skin by the application of the negative pole, is quite a delusion.

True it is that, after a sufficient time, with enough current, the iodine disappears, but it has simply entered the skin as sodium iodide. The writer has repeatedly demonstrated that by causing the vapor of chlorine gas to impinge upon an artificial conducting medium, after stopping the current, the iodine cloud develops at once, revealing its exact position.

In the ordinary operations of electrolysis with which we are familiar an effort is made to select electrodes which resist chemical attack, as gold, platinum or iridium.

The modern surgical cataphoric operation is done with a positive electrode of zinc amalgamated with mercury purposely selected with a view to the development of the chlorides or oxychlorides of zinc and mercury and their diffusion through the surrounding tissues.

A major operation of this kind is done as follows:

The one hundred and ten-volt direct Edison current, or a current of similar strength from a sufficient number (about sixty) battery cells is employed. An efficient controller must be inserted in the circuit best of the graphite type for turning the current on and off very gradually, without shock to the patient.

A milliamperemeter capable of registering a thousand or fifteen hundred milliamperes should be in the same circuit with the patient for keeping track of the current strength employed. The patient having been thoroughly anesthetized, is laid with his back upon a broad clay pad, which should be large enough to cover the whole back and even extend down under the buttocks and under surface of the thighs. The clay electrode, soaked in warm water to increase conductivity, is in immediate and intimate contact with the skin, the lower surface being also in contact with the negative plate of sheet lead.

The positive pole is connected by a leash with three or four amalgamated zinc points, which are thrust into the substance of the growth to be destroyed.

The current is then turned on very gradually till the milliamperemeter indicates a current of one hundred and fifty to two hundred and fifty milliamperes to each point, the total current rising to a strength of seven hundred or eight hundred milliamperes or more. Of course, care and circumspection must be used in the neighborhood of important nerve trunks, the phrenic, pneumogastric, etc.

By the cataphoric diffusion of the zinc and mercury salts the growth is gradually devitalized and converted into an odorless eschar, which subsequently separates.

The writer has long been impressed with the possible advantages of this method of treating malignant growths which originated in the hands of Dr. Massey of Philadelphia.

During a recent visit to the American Oncologic Hospital of Philadelphia, incorporated and put in operation within the last few months, for the treatment of cancer and tumors in general, my previous conceptions as to the value of this procedure were amply justified.

In this institution the cataphoric operation is in frequent use and gives excellent results. The advantages which can be fairly claimed are these:

1. It is a bloodless operation, which is a minor consideration, but one worth taking into account.
2. There is no effusion of lymph or creation of fresh surface during the operation. If there is any foundation for the growing feeling among surgeons that there lurks a possible danger in these operations of accidental reimplantation of cancer cells, this is a matter of prime importance.

It is, perhaps, not superfluous to call attention to the fact that according to such a conception the ordinary asepsis against bacterial invasion constitutes no barrier to cancerous reinfection, but may even facilitate it, as in the case of a successful skin graft, where asepsis favors cell preservation. In other words, is it possible that surgical care may promote the transplantation of morbid epithelium when it is not expected and not wanted?

These considerations, together with the actual results, indicate that the danger of recurrence is diminished.

A noticeable fact is the absence of pain after the operation and the absence of odor in the eschars, one of the most objectionable and repulsive features of handling these cases being thus removed.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

"Treatment of Cancer by Thyroids, Combined with X-rays."

By Charles Am Ende, M. D., American Journal of Surgery, August, 1905.

The writer uses a preparation of the extract of thyroid gland in which the deleterious substances producing unfavorable symptoms upon the heart and stomach have been removed. It is prepared in either a powder or a fluid extract. He uses the large capsules (No. 0) holding about fourteen and one-half grains of the powder, giving the patient from four to six daily, according to the severity of the case and the tolerance of the patient. As many as twelve may be taken in a day in an emergency. The daily quantity of the fluid extract administered is one to two tablespoonfuls. In one very bad case four were given daily for months, but frequently two or three teaspoonfuls per day will be found to suffice. He finds that most of these patients are able to take the larger doses for a long time without any inconvenience. A few, however, may be troubled with diarrhea. He finds that the blood pressure is increased, which is manifested by dizziness and a disposition to hemorrhages. The latter is especially noticeable in carcinomatous conditions, in recurrence after hysterectomy.

The writer reports eight cases in this paper, several of which have been treated by the X-ray with but slight improvement, previous to the combination with the extract, also several cases which have been treated with the extract before combining it with the X-ray, and his summary is that none of these cases did as well singly on either agent as they did on the combination. These cases were seen and observed by W. J. Morton, M. D., Dr. Reeves, Drs. Wm. R. Prior, F. C. Taylor and Robt. T. Morris. In fact three distinct cases were set aside as representing three distinct types of the disease by order of Dr.

Morris for trial by this method in which all responded promptly. One, a case of epithelioma that is completely cured so far without a relapse. The second, a case of sarcoma of the left breast is considerably improved. Third, a case of carcinoma of the breast, which is apparently cured.

CASE I.—Epithelioma of lower lip—presented a small scab upon an inflamed base, about half an inch in diameter, lancinating pains along the lip. Used thyroid in small doses, and mild local treatment. Pain and scab disappeared and swelling reduced, when extract gave out and could not be replaced for quite a while. Patient was then transferred to Dr. Morton in the Post-Graduate Hospital for treatment by X-rays. Later the thyroid material was added to the X-ray treatment, when Drs. Morton and Reeves both noticed a remarkably rapid improvement. The case terminated favorably and there has been no recurrence to the present time.

CASE II.—Great abdominal pains radiating to and from the lumbar spine, purulent leucorrhea for a year or two, recently sanguineous, loss of appetite and flesh. Uterus was found rather large, firm, injected, cervix torn, on lower lip a pea-sized, hard nodule and some small ulcers, bleeding on contact; penetrating fetor. Treated two weeks with four capsules and two teaspoonfuls of fluid extract daily; locally cauterization, tamponade, etc. After two weeks pain ceased, leucorrhea was less, not sanguineous, but yet fetid. Appetite, strength and mentality improved, patient dismissed with all symptoms relieved.

CASE III.—A post-hysterectomy. Recurrence one and a half year later. Thyroids were administered under the supervision of Dr. Prior. Patient ordered to take four capsules per day. She did so when suffering from pain or felt weak, neglected them usually when feeling better. She took for a while six or eight capsules per day. Later she suffered from hemorrhages and relapsed. She later returned to the writer, when patient was found to be extremely feeble, unable to stand up, but had to be lifted from her couch upon the table when standing alongside. There was an erosion at the fundus, through which a probe would pass into the peritoneal cavity; a lobulated tumor occluding the bowel; and a firm infiltration of the vesicovaginal wall with numerous other complications. She was given one and a quarter drams improved thyroid in capsules and radium was used locally three times a week, after which tamponades were used. This was kept up until she was able to journey to his office, five miles away, for treatment by the X-ray. This patient improved greatly and much more so upon the combination of the X-ray and thyroid than upon either separately.

CASE IV.—A post-hysterectomy. Another case that did well on the combination.

CASE V.—A severe case of side of face, neck, shoulder and arm involved. This case, though a frightful one, received marked benefit from the combination.

CASE VI.—Right breast had been removed for fibro-myoma. First symptoms of recurrence were relieved by the thyroid extract. She returned later with an involvement of the left nipple and breast. The case was markedly improved under the combination, but there was metastasis.

CASE VII.—A truly dreadful case, which improved under the combination, but there were numerous metastases.

CASE VIII.—A post-hysterectomy with recurrence at fundus. Improved very much under combination.

RADIOGRAPHY.

EDITED BY HERMAN GRAD, M. D.

Roentgen Diagnosis of the Diseases of the Lungs. By G. F. Pfahler, M. D. Journal of A. M. A., January 6, 1906.

The writer quotes in his opening paragraph Dr. Judson A. Daland's statement: "No chest examination is complete without an X-ray examination." He advises that the study of lung conditions are best made from the negatives and that the X-ray exposures must be made with the patient holding his breath. The time necessary for these exposures with a good coil is from three to fifteen seconds. A good negative has been taken of the chest of a child nine years old in one-tenth of a second. He advises that a careful physical examination should precede the Roentgen examination, as it will assist in interpreting the skiagraph. In tuberculosis, is the principal field of usefulness for this method of diagnosis. He considers the fluoroscope examination as being both dangerous from the disposition to make long exposures as well as the too frequent exposures of the physician in making such examinations; and states that with a good skiagraph these exposures are not necessary. One negative should be made with the plate posterior to the patient and another anterior, so as to give a proper value to the lesions lying near the surface. Except when pleural effusions are suspected, the exposure should be made with the patient in a recumbent posture with the tube at a distance of from eighteen to twenty inches from the plate. The exposures should always be made between interruptions. "The proper interpretation is of more importance than the making of it."

Old calcified tubercles give decided shadows and can be recognized as small as one-eighth of an inch in diameter.

Old scars or fibrous tissue cast less dense shadows and require larger lesions to be made out, and may be recognized "by their band-like appearance." Consolidations may vary in

the density of the shadows with the size of the lesion. An area half an inch in diameter can be recognized in an emaciated person. Consolidations may also be recognized by comparison of the suspected area to that of the opposite lung or other portions of the same lung. The fact that the skiagraph shows the presence of numerous light spots on the plate may lead to the false conclusion that there is no healthy lung tissue, the shadows being cast in one plane. This error may be differentiated from the fact that when much disease exists, the evidence of density will be general. The shadow is rarely uniform when the whole lobe is involved. There are liable to be large or small cavities or compensatory emphysema associated with the consolidation. Cavities are usually recognized by greater transparency surrounded by a shadow of consolidation. Emphysema is noticeably transparent.

The radiograph appearance of a pulmonary abscess does not differ materially from that of a cavity. The scar area of consolidation, however, is likely to be larger in proportion to the size of the cavity. Careful comparison of physical signs will greatly assist in differentiating these conditions. The same thing applies to differentiating pulmonary gangrene, except that instead of the area of consolidation being large and the cavity small, the cavity is more liable to be large and the surrounding wall small. The odor will assist in diagnosis.

In pneumonia the shadows are very dense over the affected lung. He quotes Williams of Boston in the statement that the rays will localize the lesion more accurately than can possibly be done by any other means. That the rays are of great assistance in studying the cases during the stage of resolution is very important. The rays show lesions of pneumonia long after the physical signs are absent. In emphysema the transparency is striking, affecting both lungs as a rule. The ribs are found to extend outwards from the spinal column more nearly at right angles than normal.

Collapse of the lung is not usually recognized by the use of the Roentgen ray when the area is small. When large the appearance is very similar to that of consolidation.

Thickening of the pleura is recognized in the skiagraph as a uniform shadow of density varying with the degree of thickness, shading gradually at its edges. If the lung is healthy there will be little difficulty in recognizing a moderate thickness. Pleural effusion is best recognized by placing the patient in a sitting posture with a plate or fluoroscope posteriorly and the tube anteriorly. Place a board at the back of the patient to support the plate. The pleural effusion gives a uniform but not dense shadow, occupying the lower part of the pleural cavity. The level has a curved but not an irregular outline. The pleural thickening will be recognized by its irregular border.

In pneumothorax the transparency is great—distinctly greater than in emphysema. In hydropneumothorax the findings in addition to those of pneumothorax show the opacity at the base. In hemothorax the shadow is more dense than in other forms of pleural effusion.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

How We Catch Cold.

Modern research seems to have established the fact that after all the "old-fashioned" ideas with regard to colds are not far wrong. It is, of course, true that a "cold" is a malady due to germs; but there seems to be no doubt that the chilling of the body lessens its resistance and so renders it an easy prey. In the Arctic regions, where the influenza germ cannot live and where colds are said to be unknown, it may be safe to sit in a draft or to get one's feet wet; but in the temperate zone these indulgences will continue to be risky for the average man. Says a writer in *The Medical Record*:

"The rationale of the causation of the ordinary 'cold' is pretty well understood at the present day, and it is generally conceded that when circulatory disturbances or vital depressions are produced as the result of localized or general chilling of the body surface, newly entered or already present pathogenic bacteria are enabled to attack the body with very good chances of success. At such times it is said that the powers of resistance are below par, and consequently the bacteria gain an easy victory. This point was illustrated in telling fashion by Durck, who found that rabbits infected with pneumococci developed pneumonia if they were subjected to severe cold, whereas unchilled control animals survived.

"The mechanism of this weakening of the vital forces has not been satisfactorily explained, however, and considerable interest, therefore, attaches to experimental work on the subject recently done by Franz Nagelschmidt. This observer contributes to the recent *Senator Festschrift* a description of his studies on the hemolytic and bactericidal power of the blood after the animal has been exposed to cold. Rabbits and goats were used, and the activity of the antibodies of the serum was tested before and after immersion of the whole animal or portions of its body in ice water for varying lengths of time. The results obtained showed some curious inconsistencies that still demand explanation, but in general it may be said that by chilling the surface it is possible to reduce the number of antibodies in the blood to a very marked degree. This means that the body is deprived of a goodly proportion of its defensive

weapons, and therefore under such conditions it easily falls a prey to infections of all sorts. The effect of cold in bringing on attacks of paroxysmal hemoglobinuria is well known, and it may be that this obscure condition will be illuminated by further developments along the same line of investigation. A point of practical importance is the fact that it was found that repeated exposure to slight degrees of cold brought about an increase of antibodies, and this observation therefore affords a theoretical justification of the practically approved methods of "hardening" the body by hydrotherapeutic and other methods of training. Such procedures should not only serve to protect against cold and allied conditions, but also should render the body better able to cope with bacterial and other noxa of all kinds." (Literary Digest.)

Cold Affusion in Delirium Tremens. Sir William Broadbent, F. R. S., Brit. Med. Jour.

For many years the writer has used cold affusion in delirium tremens, always with immediate success, but the treatment does not seem to have found its way into the text-books. The patient is stripped naked and lies on a blanket over a waterproof sheet. A copious supply of ice-cold water is provided, and a large bath sponge dripping with the iced water is dashed violently on the face, neck, chest and body as rapidly as possible. He is then rubbed dry with a rough towel, and the process is repeated a second and third time. He is turned over and the wet sponge is dashed on the back of the head and down the whole length of the spine twice or thrice, vigorous action with a bath towel being employed between the cold water attacks. By the time the patient is dried and made comfortable he will be fast asleep.

A man of about thirty was addicted to alcohol. After a week of continuous drinking he had delirium tremens, or, perhaps more strictly, hallucinations; he was more violent and had less delirium ebriositatis, since, with characteristic tremor than is usual in delirium tremens proper. A complication which almost precluded recourse to opiates or sedatives was the presence of a large amount of albumin in the urine. The treatment was carried out with result of sound, refreshing sleep and speedy recovery. The albuminuria gradually disappeared.

The writer has used cold affusion even when there was extensive pneumonia with the delirium tremens. When the patient wakes up the tremor is gone, the relaxed, perspiring skin is warm and dry, and the weak flickering pulse has recovered tone.

In rheumatic and enteric hyperpyrexia the effect of the cold bath is not simply due to the abstraction of heat. The graduated bath has much less effect than the plunge into cold water,

and may have no effect at all unless cold affusion is applied to the head. It is not easy in domestic practice to give a cold bath in these cases, and may be impossible. Affusion by means of a bath sponge, followed up by a wet sheet, may meet the emergency.

FOREIGN ABSTRACTS.

EDITED BY AMÉDÉE GRANGER, M. D.

Note on the Galvanic Resistance of the Head in Neurasthenia. By Dr. Lad. Haskovec, Privat-Dozent. (Prague.)

(1) There exists no relation between the galvanic resistance of the head and the blood pressure in the radial artery.

(2) The resistance of the head is sometimes great, and, at others, small, in cases with high blood pressure (150 to 170 mm. by the instrument of Gaertner).

(3) More regularly, the resistance is found to be relatively small when there is hyperemia of the head. In these cases, the blood pressure in the radial artery may be normal, subnormal or above normal.

(4) In the aged and in subjects without cerebral hyperemia, the resistance is regularly found to be greater than in the neurasthenics with congestion.

(5) With a striking regularity (although not constantly), the resistance is found to increase in neurasthenia after a few weeks of treatment, by daily galvanization of the head, when the state of the health shows some improvement and the various symptoms (vertigo, buzzing in the ears, feeling of compression in the head, insomnia), begin to disappear.

(6) From the standpoint of diagnosis and prognosis it will be interesting to study this last phenomenon on a large clinical material.

(7) At present it cannot be stated whether this phenomenon depends upon the circulatory condition of the head or upon the chemical constitution of the contents of the skull. (Read before the 1er. Congrès International de Physio-Thérapie, Liège, 1905.)

Electro-Diagnosis of Primary Progressive Muscular Atrophy.

By Dr. V. Capriati, Naples.

It is a fact of common observation that in the healthy man, the muscles when directly excited by the galvanic current react almost exclusively to the closing contraction.

C C C > A C C

They behave in a very different manner when the trunk of the motor nerve is excited. Then we perceive, even plainly, the opening contraction, especially at the positive pole. These—if the excitations are repeated with an increasing current

strength—finally equal and often excel the closing contraction at the same pole.

When a nerve trunk is excited we then have the following normal formulæ of contractions (in the order of their intensity) :

- (a) C C C > A C C > A O C > C O C
- (b) C C C > A C C = A O C > C O C
- (c) C C C > A O C > A C C > C O C

This last reaction is not as rare as we believe when the nerve is very superficially located. I have almost invariably obtained it by stimulating the ulnar nerve at the elbow.

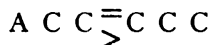
The difference in the reaction of the normal muscles to the galvanic current, when the excitation is applied directly to the muscle substance or to the nerve trunk, seems strange when it is considered that the direct muscular stimulation made at the point of election is in substance only nervous stimulation.

It is, however, justified by the more or less superficial situation of the nerve, and, in consequence, the greater or less degree of facility with which it feels the effects of the current of polarization.

Pathological conditions will cause modifications in the normal formulæ of the contractions at the two poles.

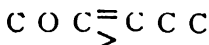
Those which are best known up to the present time are the two following:

(1) The classical reaction of Erb, which forms part of the electrical syndrome of degeneration.



Equality or preponderance of the anodal closing contraction over the cathodal.

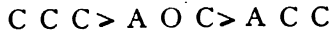
(2) The reaction of Rich, which is easily obtained in the nerves of limbs which have previously been rendered bloodless by means of the Esmarch constrictor.



Equality or preponderance of the cathodal opening contraction over the closing contraction.

In two cases of primary progressive muscular atrophy, by applying galvanic stimulation directly to the muscles, I was able to produce those variations of the intensity of the contractions at the anode during closure and opening of the current, which, in health, are only obtained when the stimulation is applied directly to the nerve trunk. That is, galvanic excitation of the muscles, besides closing contraction at the cathode and anode, produced also an opening contraction at the anode, and frequently, by increasing the current strength, these became more energetic; finally becoming stronger than the

cathodal closing contraction, they gave rise to the following formula :



It has been impossible to obtain the faintest sign of the reaction mentioned above in numerous tests which I have made upon patients suffering with the various forms of paralyses or muscular atrophies.

And I have come to regard it as characteristic of primary progressive muscular atrophy.

In significance the reaction which I have just indicated has nothing abnormal. It is due less to any alteration in the muscular tissue than to the integrity of the intramuscular nerve fibers which have become more superficial, and, in consequence, more directly excitable as a result of the disappearance of the surrounding muscular tissue.

It is, however, of great semiologic value, and would be of capital importance in the differential diagnosis between progressive muscular atrophy of nervous origin—due to nerve or spinal cord lesion—and primary progressive muscular atrophy, when compared with the relative value of the other symptoms now considered as pathognomonic. (Read before the 1er. Congrès International de Physio-Thérapie, Liège, 1905.

The Electrical Treatment of Dyspepsia. By Dr. Leullier.

In his monograph on the electrical treatment of dyspepsia, Dr. Leullier attempts to settle this much disputed question. He reviews briefly the actions, both motor and secretory, of the various electrical modalities upon the unstriated muscular fiber and the glands of the stomach, and looks for a technique which, while giving the maximum effects, would still remain within the reach of every practitioner.

On the one hand, the experiments of Bardet, and especially of Max Einhorn and Rockwell, their numerous analyses of the gastric juice before and after each séance, and on the other, the recent laboratory investigations of Delherm and Truelle, which established clearly the physiological action of the unstriated fibers and its modes of reaction to the various electrical currents, permit him to assert that the direct method of application should have precedence over the percutaneous one in electro-therapeutics of the stomach. It is precisely upon this point of the technique that his arguments were concentrated, and in which also resides the interest in his work.

Dr. Leullier believes that for these intragastric applications, a flexible sound, of small caliber, modeled after that of Bardet, should be employed.

The author arrives at the following conclusions, which are

based upon his personal experience in the treatment of atonic dyspepsia, with dilatation.

"The dyspeptics, and notably those with atony, those with dilatation and perverted functions, who have derived little or no benefit from ordinary medication, should be given a course of electrical treatment.

"We should employ in these patients, preferably, interrupted galvanization, in conjunction with galvano-faradization, with slow interruptions.

"The active electrode must be applied directly to the coat of the stomach, as this is essential to a favorable therapeutic result. (Positive pole intragastric.)

"Employ preferably the sound of Barbet as modified by the author, or the electrode of Max Einhorn, and use medium current intensities of 15 to 20 mm. for 20 minutes.

"The favorable results are explained:

"(1) By the gymnastic and massage of the muscular walls of the stomach.

"(2) By the secretory, vasomotor and sensory actions of the current, the whole dependent upon a reflex nervous arc, the center of which is represented by the sympathetic plexuses and ganglions of the abdomen." (Read before the 1er. Congrès International de Physio-Thérapie, Liège, 1905.)

The Early Employment of Large Intensities of a Continuous Current in the Treatment of Herpes Zoster. By Dr. Leullier.

Dr. Leullier has experimented with the early employment of the continuous current in the course of herpes zoster, and especially at the very onset of the disease. He has followed with success the technique indicated by Dr. Larat,* but using average intensities of 50 mm., while the former author only employed 10 mm. In order to avoid scarring he made use of very large and flexible electrodes, snugly adapted to the affected side of the thorax (the negative pole over the vesicles), the positive pole was placed over the points of emergence on the thoracic nerves from the spine.

He obtained immediate relief of the pain, without any subsequent neurotic after-effects. He believes that the current acts principally upon the spinal ganglia and the medullary centers and attributes the good results obtained to the vasomotor action of the current. Briefly, this is a new method of treatment, which it would be interesting to test in the treatment of this very painful affection, for the relief of which the classical treatments have accomplished practically nothing. (Read before the 1er. Congrès International de Physio-Thérapie, Liège, 1905.)

* Dr. Larat's original contribution on the subject was published in the *Revue International d'Electro-Thérapie*, October, 1904, and abstracted in *THE JOURNAL OF ADVANCED THERAPEUTICS* for April, 1905 —EDITOR.

BOOK REVIEWS.

FOOD AND DIET IN HEALTH AND DISEASE. By ROBERT F. WILLIAMS, M. A., M. D., Professor of Practice of Medicine in the Medical College of Virginia. Lea Brothers & Co., Philadelphia and New York, 1906. Price, \$2.00 net.

This work has been prepared with great care and shows much study and experience. It includes eleven chapters on Food in Health and nine chapters on Food in Disease. In the chapters on Food in Health are included discussions on the Chemistry of Foods, the Physiological Processes, Cooking, Proteid Foods, Carbohydrate Foods and Salts, Fat Foods, Water, Quantity of Food, Frequency of Feeding, Relation of Food to Exercise, Sleep, and Tobacco, Food in Childhood and Old Age, and Food in Infancy.

The remaining chapters are devoted to Feeding the Sick, Food in Infectious Diseases, Food in Diseases of the Digestive Tract and Disorders of Nutrition, in Diseases of the Kidneys, in Diseases of the Secretory and Respiratory Tracts and in Diseases of the Skin. The last chapter is devoted to a Consideration of Dietaries and Recipes. Foods have too often been empirically prescribed when a prescribed or restricted diet was necessary, yet there is probably no more important factor in the subject of human economy than that of food—upon which metabolism is based. The work is recommended to all who would be familiar with the foods indicated in various conditions for their patients.

MAN AND HIS POISONS. A Practical Exposition of the Causes, Symptoms and Treatment of Self-Poisoning. By ALBERT ABRAMS, A. M., M. D. (Heidelberg), F. R. M. S., Consulting Physician Denver National Hospital for Consumptives, The Mount Zion and French Hospitals, San Francisco; President of the Emanuel Sisterhood Polyclinic; formerly Professor of Pathology and Director of the Medical Clinic, Cooper Medical College, San Francisco. Price, \$1.50 net.

As Dr. Abrams states in the preface "the subject of self-poisoning has advanced from a plausible and fascinating theory to a verity." Intestinal self-poisoning is a subject of great importance, and one which heretofore has often been overlooked. The body "is a receptacle and a laboratory of poisons, and every moment of his life man is exposed to the danger of being overpowered by poisons generated within his system." Self-poisoning may be the cause of bizarre and protean diseases as well as mental and nervous diseases. Self-poisoning symptoms are usually objective and thereby often escape the physician's attention. The contents include a discussion of Life, Man and His Poisons, Fatigue, the Toxicology of the Emotions and Sleep, Chemistry and Physics of Thought, the Symptoms of Self-poisoning, the Physiology of Living in Relation to the Prevention and Cure of Self-poisoning.

the Treatment of Intestinal Self-poisoning by the Sinusoidal Current, the Mental Dyspeptic and the Influence of the Mind upon the Body, and Relief for the Ideopath. The Appendix contains notes of importance relative to the following: Vasomotor Factor in Blood Pressure, the Abdomen in Intra-abdominal Venous Congestion, Chromo-Diagnosis, the Tracheal Traction Test, the Liver and Lung Phenomena, the Visceral Reflexes, the Lung Reflex of Contraction, Sphygmography of the Abdominal Aorta, Quantitative Determination of Indican, and the Chemistry of Social Diseases. The work is unique, and the subject is treated in a most exhaustive and able manner as characterizes Dr. Abrams' works. One chapter is devoted to the treatment of Intestinal Self-poisoning by the Sinusoidal Current. In this chapter an account is given of a Chemic Demonstration of the Action of the Current. The treatment of Self-poisoning has been considered in a most scientific and rational manner. The work is one which the physician, who desires to do justice by his patients, can ill afford to be without. The author is to be congratulated on awakening the interest of the profession in a subject of so much importance, but which has so long been overlooked. The publishers are to be complimented on the printing, binding and general excellence of the work.

PROGRESSIVE MEDICINE, VOL. III, SEPTEMBER, 1905. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARE, M. D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia. Octavo, 298 pages, with 22 engravings. Per annum, in four cloth-bound volumes, \$9.00; in paper binding, \$6.00. Carriage paid to any address. Lea Brothers & Co., Publishers, Philadelphia and New York.

The subjects discussed in this number are Diseases of the Thorax and Its Viscera, including the Heart, Lungs and Blood-vessels; Dermatology and Syphilis; Diseases of the Nervous System and Obstetrics.

In the discussion of Thoracic diseases, Dr. Ewart takes up the newer methods of examining the heart, particularly radioscapy, and shows its relation to percussion and auscultatory percussion. The action of the organ and its co-ordination have been considered by sphygmographic methods of Mackenzie. Blood Pressure in Relation to the Heart receives due consideration.

Tuberculosis, Cytodiagnosis, Pneumococcus disease of the lung in all its forms, and the treatment of tuberculosis receive due mention.

Gottheil from his large and varied experience has written on dermatology and syphilis in a most able manner. He speaks of Actino-therapeusis, Bromide Eruptions, Dermatitis Atrophicans, Eczema, Metastasis, Facial Cosmetics, Gangræna Cutis

Multiplex, Lupus Vulgaris, Nævus (Vascular and Pigmented), Nail Affections, Noma, Pemphigus, Pruritus, Psoriasiform Disease and Tuberculosis of the Skin.

The diseases of the Nervous System are treated quite exhaustively by Spiller and some nerve troubles which have lately required a change, theoretically or practically, are discussed. He first considers Diseases of the Brain, followed by discussions of the Spinal Cord, Diseases of the Peripheral Nerves, and Miscellaneous Nervous Diseases. It is to be deplored that the author did not recognize the value of some of the static modalities in connection with the use of vibration in the treatment of such diseases as tabes, and anterior poliomyelitis. Well-graded and systematic exercise should also receive consideration in the treatment of many nervous diseases.

The chapter on Obstetrics by Dr. Norris enlightens us on the subject of Albuminuria in Pregnancy and Eclampsia. Although the Quarterly Digest has a paper cover it is printed in good form, and the contributions are of an order that deserve rebinding in cloth.

NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

NAUHEIM CARBONIC ACID BATH AND THE VARIOUS METHODS AND APPARATUS EMPLOYED FOR PREPARING THE SAME.

Until the present time hospitals, sanitarium, and private institutions have been compelled to resort to rather primitive and inefficient substitutes for preparing a Nauheim bath which would equal, in efficiency, the natural spring waters of this celebrated spa.

Commercial preparations in solid form have been placed on the market, from which was generated carbonic acid in a rather weak form, wholly insufficient for the purpose. The development, of course, was not satisfactory; the saturation too weak for practical purposes. The generating substances being composed of inorganic chemicals or mineral acids, were injurious to the patient and accidents of painful burns have frequently happened when the patient unconsciously came into direct contact with developing cakes, or unknowingly happened to be seated upon such developer while taking bath.

The old methods for preparing the Nauheim bath have now been superseded by a preparation known as the Zeotoo Packet, which in point of efficiency marks a great step in advance of the old methods. The Zeotoo Packets for preparing Nauheim baths, which are now largely introduced into practice, will no

doubt be fully appreciated by the medical profession when their merits have become better known. Their greater efficiency is due to the possibility of developing a larger volume of gas, and on account of the developing solution used for this gas being chemically bound to the water. Furthermore, it is superior to the old preparation, due to the fact that the generation of the carbonic acid is accomplished by organic substances which are not injurious to the skin of the patient, but on the contrary, the composition is calculated to be highly beneficial to the human body.

These Zeotoo Packets may be purchased of any druggist. They are intended for home treatment of the patient upon

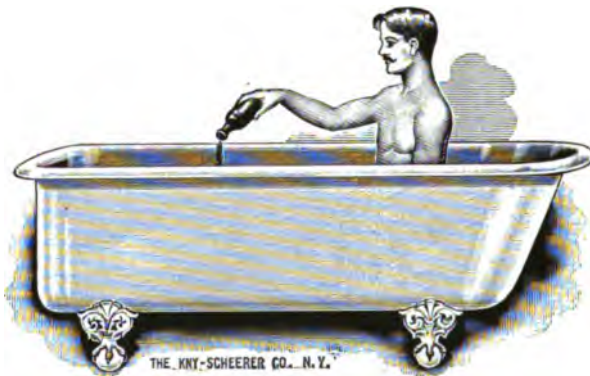


Fig. 1.

physicians' prescription, and the prices are so moderate that a large demand for these will undoubtedly be created. As a rule a series of twenty baths, taken on alternate days, will bring about the desired results.

This method, while unquestionably the very best that can be prescribed to the patient for the home treatment, is not as satisfactory for hospitals, sanitarium, or private institutions, and many physicians will prefer to annex to their office a bath room for giving Nauheim baths under their own immediate supervision.

The method used in Europe as well as this country, by institutions making a speciality of giving Nauheim baths, requires large and expensive apparatus, designed for mixing the water taken from the hydrant, and injecting into it certain quantities of liquefied carbonic acid, which can be bought in wrought steel cylinders on the open market. Their efficiency is very limited, as they are entirely too expensive for general use and are only suited for an institution making a speciality of giving from 50 to 100 or more Nauheim baths a day.

The Kny-Scheerer Co. was called upon to develop a form of apparatus that could be used in connection with liquefied car-

bonic acid and which should answer all practical purposes, be not too expensive, easily regulated and controlled. This problem was solved to perfection. The Kny-Scheerer Co.'s Zeotoo Mixing Cylinder, of which we herewith present an illustration, is admirably suited to the purpose: it is intended to be

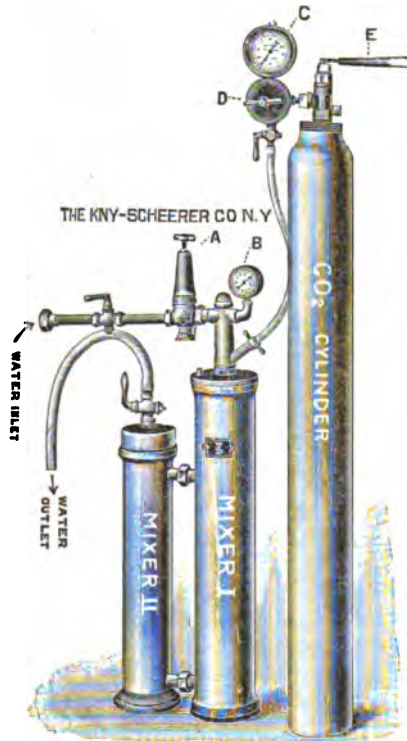


Fig. 2.

connected with the hydrant water wherever a pressure of at least 20 to 50 pounds may be had. The apparatus consists of two cylinders, connected intimately with each other by mixing pipes, each having interior mixing chambers by which a thoroughly saturated solution is obtained. The principle upon which this apparatus is constructed lies in the possibility of mixing gas and water under the same amount of pressure. The pressure of the hydrant water is the unit according to which the gas pressure is regulated. To accomplish this purpose a pressure regulator is placed upon the pipes also a pressure registering gauge. For connection with the liquefied carbonic acid cylinders, a gas pressure regulator and pressure registering gauge is supplied. This forms the equipment ready to be set up at the head or foot end of a bath tub, and the apparatus is ready to be connected by any plumber to the water

supply pipes. Apparatus complete is furnished by The Kny-Scheerer Co. at the price of \$120.00 a set.

Zeotoo Mixing Apparatus for Low Pressure.

Aside from this apparatus with double mixing chamber, The Kny-Scheerer Co. has now in the course of construction, a single cylinder mixer, intended for use in cases where no water pressure is available. This apparatus works automatically, the water being taken from a tank, which may be elevated above the mixer from 8 to 12 feet, or be located on the roof.

The construction of this Zeotoo Mixer for low water pressure is such that by force of suction, which is created by a stream of carbonic acid gas liberated from the gas pressure cylinder, the actual water pressure of say five pounds, per square inch, is increased to an equivalent of from 50 to 75 pounds in the mixing cylinders, whereby an intimate mixing of water and gas is accomplished. A powerful jet of carbonic acid taken at high pressure from the gas cylinder accomplishes this result in the most practical and thorough manner.

Both sets of apparatus herewith described for high pressure and low pressure of water, work to perfection. They supply the carbonated water highly saturated in ample quantity. Their manipulation is very simple and their construction durable, while results can be absolutely depended upon, and an advantage in their favor is economy. With a cylinder containing about 20 pounds of liquefied carbonic acid, costing about \$2.00 to \$2.50, a number of from 20 to 25 Nauheim baths may be prepared. Such baths are in every way equal to the natural carbonic spring water bath, and since the source of the carbonic saturation can be regulated at will, they are in this respect superior to the natural carbonic acid waters as given in Nauheim and other European spas.

SPECIAL NOTICES.

—For Sale, to close an estate, a ten-plate static machine, made by the Jerome Kidder Co., together with electric motor and current controller. Price \$175, purchaser to pay for boxing and shipping. Original cost \$400. Address Mrs. B. F. Bronson, 449 State Street, Bridgeport, Conn.

—For Sale: The best equipped office in Central Iowa, with complete radiotherapy and electrotherapy apparatus. Business has netted present owner over \$4,000 cash per annum for 10 years. Building, grounds and contents, inventory \$7500, will be liberally discounted and no charge made for practice and introduction. Location is county seat. Population, 5,000. Has a Sister of Charity hospital, 40 beds. No surgeon in 20 miles. Man doing surgery can double my income. Address M. D., care of this journal.

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THE ASSOCIATION OF THE VARIOUS PHYSICAL AGENTS INTO A RATIONAL THERAPY.*

BY PROFESSOR CARLO COLOMBO, M. D., ROME, ITALY.

There are not many physicians at the present day who would still do themselves the injustice of ignoring the existence of physiotherapy; but, granting that this science is left at random as to official instruction, how many of them know really all the curative efficacy associated in it, and are in a position to set down all the rational indications for the employment of proper measures? And even though physiotherapy does not pretend to be entirely a substitute for pharmacotherapy and for surgery, it is ever enlarging the confines of the pathological field in which it has rendered inestimable service. And they are not on the whole censurable who, basing their claims on the recent marvelous results of radiotherapy in the specific cutaneous lesions of cancer and in other more or less malignant superficial or deep neoplasms of the organs, as in leucemia, believe that physiotherapy will become ever a more valuable and indispensable auxiliary of the old therapeutic systems, of physicians and surgeons, in cases in which there are morbid infections which all may agree to consider as their exclusive domain. But the incontestable value of physiotherapy should shine forth in that vast field of incurable diseases, left completely at random by the old system of medicine, with the bitter confession of its own impotence.

All its reason for existence is revealed in that innumerable army of grave maladies, slow and progressive in their course, which undermine insidiously the whole organism, or abolish forever the function of important vital organs; and lastly in profound lesions of the nervous centers, from consecutive functional alterations to traumatic lesions, and in all those

* Read at the Fifteenth Annual Meeting of the American Electro-Therapeutic Association, held at the New York Academy of Medicine, September 21, 1905.

pathological forms without anatomical substratum, which though being, in the last analysis, simply functional disturbances, without any gravity in themselves, do not on this account cease to render intolerable the lives of patients so afflicted. And it is not our business to record what relief was not forthcoming before the physical agents came to be utilized in medicine, for the unfortunate stricken with hemiplegia, with infantile paralysis, with tabes dorsalis, with arthritis deformans, with muscular atrophy, either external or deep, with rigidity and articular ankylosis.

On the other hand, the old *materia medica*, through the nature of its own resources, is compelled to be limited, in those maladies which involve the whole economy of the organism, to a superficial and transitory action; in other cases, this is reduced to a task often purely palliative, which consists in opposing a drug more or less active and harmless to each one of the symptoms, which by turns predominate in the diseased frame.

What medicament is capable, either alone or associated with others in the most studied and logical combination, of bringing about a fundamental and durable change in an obese person? Certainly not those which enjoy nowadays the greatest reputation, iodide of potassium and thryroidin, which are certainly capable of producing a powerful deterioration in the patient by the effect of a general whitewashing of the organism, but do not leave behind them any durable increase in the energy of the heart and of circulatory activity from which may result a permanent acceleration of the organic changes and an improvement of the general well-being of the individual. In the uric diathesis, and in all its manifestations, neuralgic, arthritic, visceral, etc., there is not in a dose of piperazine, of lithime, uricodin, lizidin, or sidonal, however strong, that which avails to produce in practice the thousandth part of the therapeutic effect which is habitually obtained by a systematic use of sudotherapy and of muscular exercise.

Likewise in circulatory disturbances of peripheric origin, commonly known under the name of arterial cardiopathy, based on hypertention, it is certain that not one of the so-called hypotention drugs (in the first rank being the iodide of potassium) which succeeds in producing the abatement of the blood pressure and in facilitating increased labor of the cardiac

muscle as surely and without disturbance as the massage of the abdomen (Huckar) or the general bath of dry hot air (Roman bath), or the application of a current of high frequency. In true cardiopathy, when it scarcely admits of making a show of any slight manifestation of lack of compensation, it is our duty to have recourse to kinesitherapy under the form of Swedish gymnastics, or in the manner indicated by Oertel in the Terrassi Cure; this is in the way of returning to the heart muscle a great part of the energy lost and to the general circulation its remedy, to such a degree that kinesitherapy has been called the "physical digitalis," with an advantage, since the drug digitalis has in it transiency of benefit and danger from accumulation.

As to disturbances of the digestive organs, it is a matter of common knowledge that the most obstinate constipation, arising from atony of the muscular coat of the intestine, has come to be cured radically by a month of energetic massage treatment (especially if associated with electricity), notwithstanding that the disease had been previously rebellious to every chemical remedy administered internally.

Physicians who practice near springs of purgative waters have noted certain forms of constipation which grew worse with the drinking of the waters, instead of improving, on account of which they are compelled to stop the drinking of the waters and to administer repeated doses of opium. Also in these spasmodic forms of constipation physiotherapy aids; there are those able, with very little cost, to ameliorate or cure permanently, when they treat prudently with a particular form of mild, calmative massage.

Agitated insomnia, which the most active hypnotics, as strong doses of bromide, are employed to subdue, yields to the sudorific and harmless action of a tepid or hot bath properly administered. A neurasthenic, a prey to the manifestations of depression in the mental and in the genital sphere, derives much greater and more enduring aid from opportune electrical stimulation and from suitable hydrotherapy than from the chemical excitants, such as strychnine, the action of which is always transitory and often not harmless.

Cases of painful arthritis find in local applications of dry heat a powerful and rapid means of relief and a safe and bearable means of extinguishing or at least lessening the disease process.

These are now elementary ideas among those who make physiotherapy a subject of study and of special practice. But this same subject, too often, not to say more, has caused the due exceptions to the great superiority of practicing physicians and even of those who are at the head of the official scientific movement. Therefore it will be commendable though difficult for the physiotherapists, to go hand in hand to the conquest of the posts of combat, still open to few in the medical faculties, and popularize the study and the practical applications of physiotherapy.

Physical agents are marvelous instruments in the hands of the physician which he is to utilize. He is dedicated in a special manner to the study of the physical properties of each one of them, and should practice long and patiently in their management and in the technique of their application. If it is necessary, however, to avoid the error of devoting one's self exclusively to the study and practical application of a single physical agent, it will be dangerous to specialize too much.

We ought to form a conception of physical medical treatment from a synthetic point of view, as a complex of curative means which are at the disposal of the physician, that he may avail himself of them according to the need, to combat this or that morbid entity. It is the disease which needs to have unity; and the manifestations by which it presents itself should indicate to the physician the action most adapted to overcome it.

On the other hand, we should still rarely be present in doubtful situations prejudicial to the sick person and little worthy of the physician and in which are to be sought the occasion of the discredit in which physiotherapy is yet held by some. There are colleges which pretend to demonstrate even by numerous publications that a single physical agent (by which is meant the one cultivated by themselves) is sufficient to help and to heal all diseases of whatever nature they may be, bearing themselves precisely like those charlatans who vend their specifics in the markets. And it is painful to observe that almost all branches of physiotherapy are infected by this plague, although they may be distinguished especially colossal in possession of massage, water cure, and electrotherapy. There is found in circulation a treatise on massage-therapy in which the author (an M. D.) not content with making massage and vi-

brations serve for the cure of all chronic congenital diseases, has published a great multitude of thermometric curves and sphygmographic tracings for the object of demonstrating that typhoid fever, scarlatina, diphtheria, measles, acute peritonitis, meningitis, pneumonia, and several other infectious diseases, acute and febrile, are going to be easily cured by a series of massage manipulations, and four gymnastic exercises. Not less surprising are the acrobatic feats of certain idiopathic physicians, especially of those who are taught to follow the Kneipp system, and that of not a few electrotherapists of which some, to end with, pretend to cure ankylosis by galvanic currents!

This happens precisely because the synthetic concept is forgotten, which should guide the physician in his choice of his means of endeavor, and on the contrary he is believed to make the work a trial of analyzing and cutting down the excess to make it serve a one-sided conception, on the pretext of the division of labor, but with great injury to the science. Now, let not the right be denied to the studious, of circumscribing all his own activities, to the restricted limits of a single argument, and the impartial investigator is allowed the attempt of applying a given principle to the solution of problems the most diverse and apparently the most absurd, since no damage results to third persons from his own experimental practice, and he knows well how to draw from the latter his own dispassionate and sincere conclusion. But there will at least be the risk of losing this power of being served by a monochord instrument, to the practiced professional, and to the specialist who draws from it the means for his own subsistence. This limitation of his own resources, this specialization to analytical, of physiotherapy, bears with it a great inconvenience, difficult to avoid even with greater good will and with more honest conscience. This induces the medical specialist to limit all his attention to a single physical agent which he possesses, renders his own valuation too one-sided, falsifies his entire therapeutics, and turns him aside from taking into consideration all the other elements of cure, which for him are non-existent. Under these conditions, the specialist goes on to acquire slowly and in good faith the habit of employing massage, waters, or electricity, himself comes to look upon it as the panacea for all ills, and by this narrowness is not only in danger of damaging

many of his own patients, whom he deprives, unconsciously, of other resources perhaps more efficacious, and thus discredits unintentionally the specialty which he practices.

We would bring the selfsame judgment on that physician who having chosen with care from the pharmacopeia a drug even of the most efficacious kind, as quinine or mercury, would pretend to extend the indication and the application to all the cases contemplated by pathology. The physical means of cure are certainly most valuable, and each one, in its own sphere of action, of unsurpassed efficacy, but they ought not to be presumptuously used beyond the limit of their reasonable indication, scientifically demonstrated, and above all, one measure ought not to invade the field of another.

In this association, recognized and respected, of the various physical agents among themselves, is founded the greatest value of physiotherapy, that which constitutes a true rational therapy, differing by how much we have the warning will result through a drug therapy which, perforce, remains, in the major part of the cases, a symptomatic therapy.

It is necessary, therefore, among those who practice physiotherapy, much more than among ordinary physicians, to establish with exactness the diagnosis of the disease before commencing the treatment. Do they find before them a neuralgia? The physician should not hasten to conclude: "The suffering of the patient is produced by pain, therefore my task consists in suppressing the pain by whatever means will admit of arriving most quickly at that end." With this judgment, the physician considers it his duty to practice on the patient a course of injections of morphine or other anesthetic substance, or to subject him to a sedative electrogalvanic or thermotherapeutic régime.

On the other hand, every one of us has the conviction that it is absolutely indispensable to search out the causal element, since the painful symptom could be combated in vain, so far as there remains the cause which nourishes it.

To neglect the searching out of the causal element constitutes not only an error but a real offense, for while the physician spends time in the use of the palliatives, the fundamental morbid process follows its own course and will take the physician by surprise when there shall be no remedy.

Continuing with our example, we should take into examination what can be the fundamental cause of a neuralgia, or, that we may define it better, of a sciatic neuralgia. These causes can be many, and most frequently it is induced by two. Sciatic neuralgia is ordinarily of rheumatic (infective) origin or of uremic origin. In the first case, physiotherapy has little to do; finding that the exact indication is the injection of ferric acid, he rests on his part, and the rest of the treatment is the ordinary pharmacologic.

In sciaticas of uremic origin the introduction of physiotherapy is triumphant, and this alone is capable of overcoming it.

The causal element of this neuralgia is constituted by uric-acid deposits lying in the neurilemma (nerve sheath) of the sciatic nerve, which by their presence provoke the pain, consequently the whole task of the physician is reassumed either in rendering possible the dissolving of the uric deposits within the general circulation, by provoking the elimination of the excess of uric acid circulating through the natural emunctories, or in accelerating the further normal transformation in the organism itself.

Such a multiplex object, quite other than easy, it is possible to realize by means of several physical agents rationally coordinated. Pathology teaches that the uric salts precipitate when the blood is over-saturated with them, or when by processes not yet well defined, their acidity being altered, they do not admit of holding free the excess of uric acid circulating. This then precipitates, and goes to deposit itself in those tissues and in those organs which present at that instant a greater disposition to receive it, which are, so to speak, the places of least resistance, become such by reason of innate cause (special pathological condition in action) and of external cause, commonly a rheumatic cause (stimulus from cold) or a traumatic one.

On account of the diversity of the seats of the points of least resistance we have the variety of the morbid manifestations of the uric diathesis, for example, neuralgia, when that seat is the neurilemma (nerve sheath), the cutaneous form, herpes, eczema, psoriasis, when the various layers of the skin are involved, asthma or chronic bronchial catarrh, when the bronchial mucous membrane is affected, all the various membrane is

affected; all the various arthritic or gouty forms when the place of least resistance is the surface of the joint.

From the reasons above stated, it is clear that the uric deposits lying in the tissues and determining the various morbid entities, can never be reabsorbed into the circulation except when the quantity of uric acid circulating shall be reduced in such a manner (by elimination or by oxidation spontaneously or artificially produced) as to permit the blood to hold it free within the limits of its natural saturation.

In this lies the explanation of the lack of success, not now refuted, regarding the various drugs, litholitic and anti-gout, whose efficacy lies in their solvent action on uric acid, elective action by piperazine, lisidine, uricodine (Weiss) especially on the uric deposits lying in the joints.

As physiotherapy proceeds by causing the elimination or final transformation in the organism of the excess of uric acid in circulation, does it do this in order that an absorption with the circulation of the uric salts deposited in the tissues may be possible? Wholly on the contrary, physiotherapy is employed to stimulate the activity of all the natural emunctories, the kidneys, the skin, the lungs and intestines, which in the uric diathesis are habitually very torpid and insufficient in their functions. It is especially the function of the kidneys, though often anatomically altered (gouty kidney) which with a scanty secretion of the solid components of the urine gives the greatest contribution to the supersaturation of uric acid in the blood. This renal function can in great measure be stimulated and favored by the liberal drinking of appropriate mineral waters, especially those of scanty mineralization (Fiugga), since it is now recognized that in the uric diathesis a water is as much more efficacious as it is less rich in solid materials of its own, that which renders it capable of holding force and drawing with it, through the renal filter, a greater proportion of the uric acid circulating in the blood. But however much it is possible to improve by hydrotherapy the function of the kidney, the latter will never be in a way to realize the sole but sufficient depurization of the blood. It is necessary, therefore, to have recourse to the aid of the other auxiliary functions, first of all, *sweating*, that great emunctory of reserve, whose functional capacity has limits far out, being rare in dangerous surprises. And it is thermotherapy which comes into play.

The action of heat upon the tegumentary surface of the body has for effect vigorous hyperemia of the surface tissues, and stimulating of the function of the sweat-making glands. The sweat, as is known, carries away with itself an abundance the anomalous elements free in the blood, the products of the accelerated change.

Here is not the place to compare the various means by which thermotherapy accomplishes such a result. The principal ones are: the bath of warm or artificially heated water, natural baths, artificial vapor baths, sun baths, Turkish baths, and Roman baths. All who are informed are so far agreed that among the various methods of thermotherapy, the one which produces the most perspiration, and with the greatest degree of tolerance, is the application of dry heat. The dryness of the surrounding air in which the sweating is induced favors rapid evaporation of the liquid which transudes from the pores, and thereby abstracts heat from the skin, permitting the toleration without discomfort of a temperature incredibly high. Of the various forms of general administration of dry hot air those are preferable which do not exclude the head from the surrounding hot air, the superheating of the respiratory tract having the advantage of rendering more active elimination by the lungs of those products of change whose destruction is not a superfluous intervention of this third formidable ally.

The participation of the respiratory tract in the action of the superheat, as it occurs in the Roman bath, has not only the value of a greater diaphoretic efficacy, but the fundamental conditions of safety and harmlessness. In fact, in the application of heat from which the head is excluded, as occurs in the Kellogg bath of light, cerebral congestions are far from avoided, and the unbalance of temperature which is established on the cutaneous surface and the lung surface is such as to cause very serious inconvenience on the part of the heart and of the very delicate vessels of the visceral net.

We owe to the intestines the fourth ally among the emunctories of the blood. The activity of the intestinal mucous glands will be stimulated by mild and daily saline purgatives, preferably by mineral waters having chloride and solid sulphate. The effect will be twofold, a greater elimination of uric acid from the mucous coat, and diligent cleansing of the

intestines from the waste products of digestion, in the stagnation of which, according to recent research, is the prime material from which uric acid is generated. Discharged thus, by so many and various ways, the excess of uric acid free and circulating in the blood, the absorption and the return into circulation of the uric deposits lying in the tissues, becomes much easier, and in the condition under consideration in the nerve sheath there is immediately a dislodgment and decrease of pain.

Besides fundamental elements of cure physiotherapy offers practical aids suited to combat directly this or that symptom, such as, to diminish pain, concurrent with a moderate electrogalvanic application upon the nerve, the current of high frequency, and mild massage of the part may be employed. Massage is very useful in stimulating the nutrition of the muscular mass of a joint, removing the atrophy when present.

Physiotherapy will not complete the task if the physician wishes to establish a treatment truly rational for uremic neuralgia, and to prevent its return by eradicating the cause. The uric diathesis is habitually manifested in individuals in whom change of material is retarded, in persons in whom the regulative mechanisms of the internal acts of nutrition do not perform their functions with that activity and regularity which they should normally have. Until this function of organic metabolism is permanent, the elimination of an excess of uric acid represents only an effect, direct and momentary, from diuresis and from sweating. The action of these having ceased, the uric acid will again accumulate little by little in the blood, and will tend to resume its former condition of saturation, with a repetition of the same morbid manifestations.

Acceleration of organic change is obtained principally by means of methodical exercise of the muscles, including all of the muscular masses of the body, regulated to the working power of each of them, a task easy to accomplish, especially so with the Zander mechanical system and in addition an appropriate dietetic régime from which is excluded meats, coffee, and alcoholics.

Assuming, therefore, that it is possible to establish a rational programme for the radical cure of sciatic neuralgia of uric-acid nature, the treatment should include the concurrent employment of at least four different physical agents, viz., hydrotherapy, thermotherapy, kinesiotherapy, and electrotherapy, not to include among the physical agents dietetics, though it has the closest affinity with them.

(To be continued.)

ILLUSTRATIVE EFFECTS OF STATIC AND HIGH-FREQUENCY SPARKS.*

BY W. A. DEEKS, M. A., M. D., NEW YORK.

Instructor in Electro-Therapeutics in the New York Post-Graduate Medical School and Hospital.

The accompanying series of photographs were taken by Mr. E. G. Wilkinson and the writer at the office of Van Houten

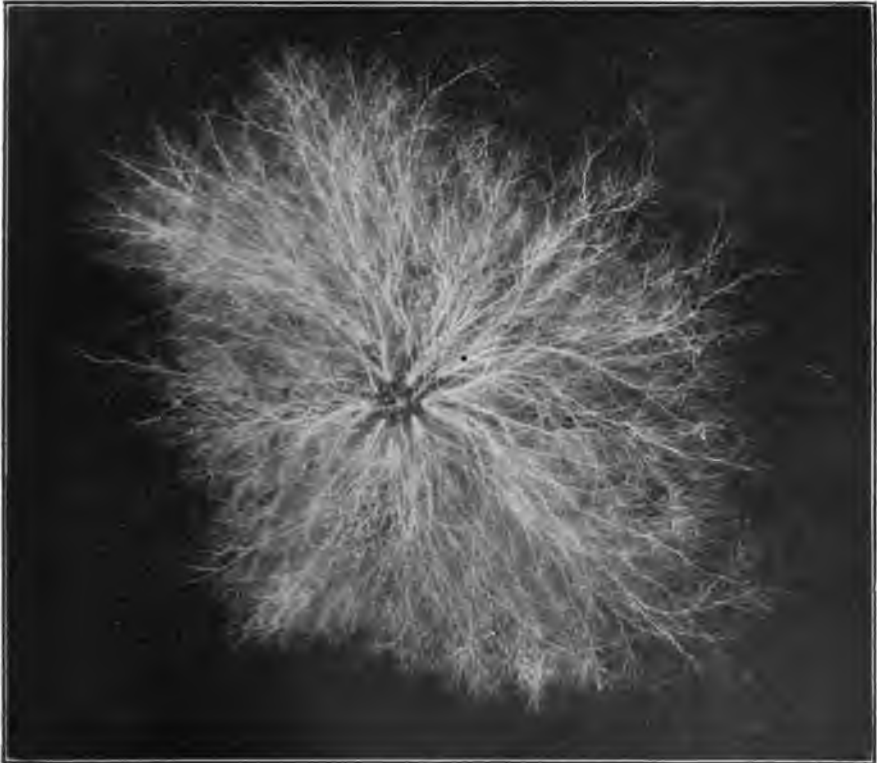


Fig. 1.—Morton Wave—Positive Spark.

and Ten Broeck. In each instance one pole of the static machine or high-frequency apparatus was grounded as was also the inactive side of the photographic plate. The other electrode was approached to the active surface of the photographic

* Presented at the Fifteenth Annual Meeting of the American Electro-Therapeutic Association, at New York, September 20, 1905.

plate which was covered with black paper. As soon as a spark passed the plate was removed and developed.

The following are the interesting points to observe. (1) The concentrated action of the static induced spark in comparison with the finely disseminated character of the high-frequency spark whether induced by Morton's solenoid-condenser, D'Arsonval, or Tesla high-frequency apparatus. (2) The very characteristic difference between the negative and positive

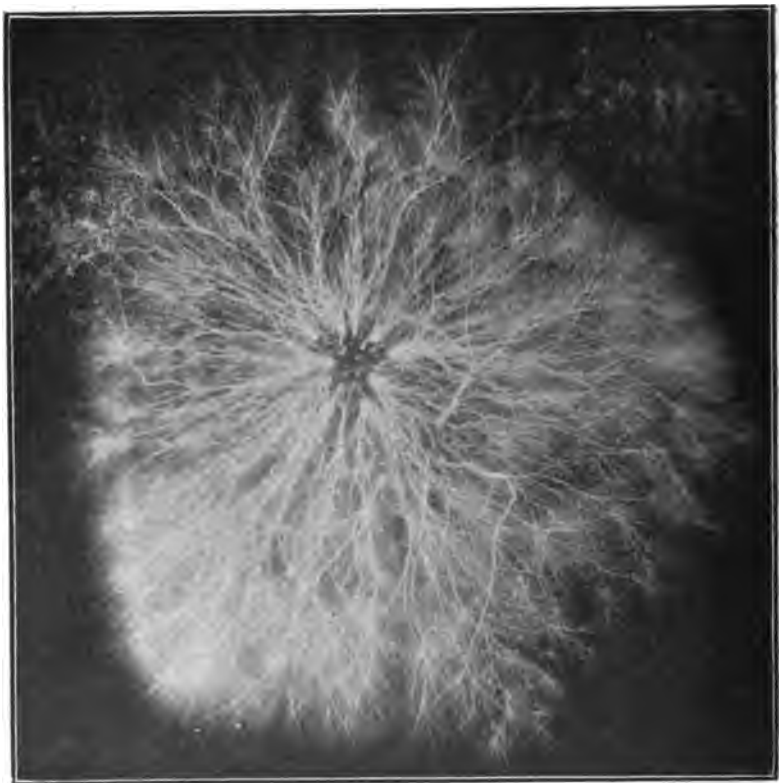


Fig. 2.—Morton Wave—Negative.

sparks which may throw some light on the reasons for the more painful character of the former. As will be seen the terminations of the negative sparks have a feathered or spattered out appearance, or as Mr. Wilkinson suggests, a pine-needle effect; whereas those of the positive sparks gradually disappear in fine ramifications.

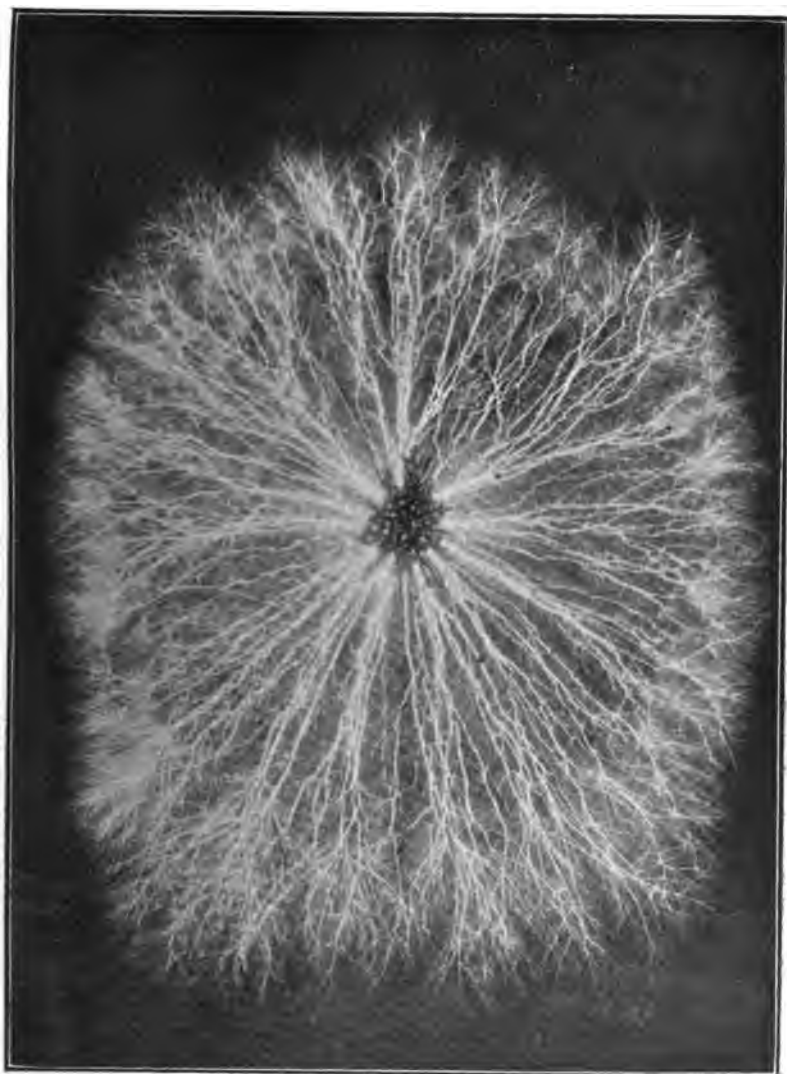


Fig. 3.—D'Arsonval.

The penetration powers of the different currents was also experimented with. The medium used was sheets of blotting paper saturated with a weak solution of pot. iodide. Owing to the chemical action of the spark the iodide became decomposed, and wherever the paper was penetrated it was readily

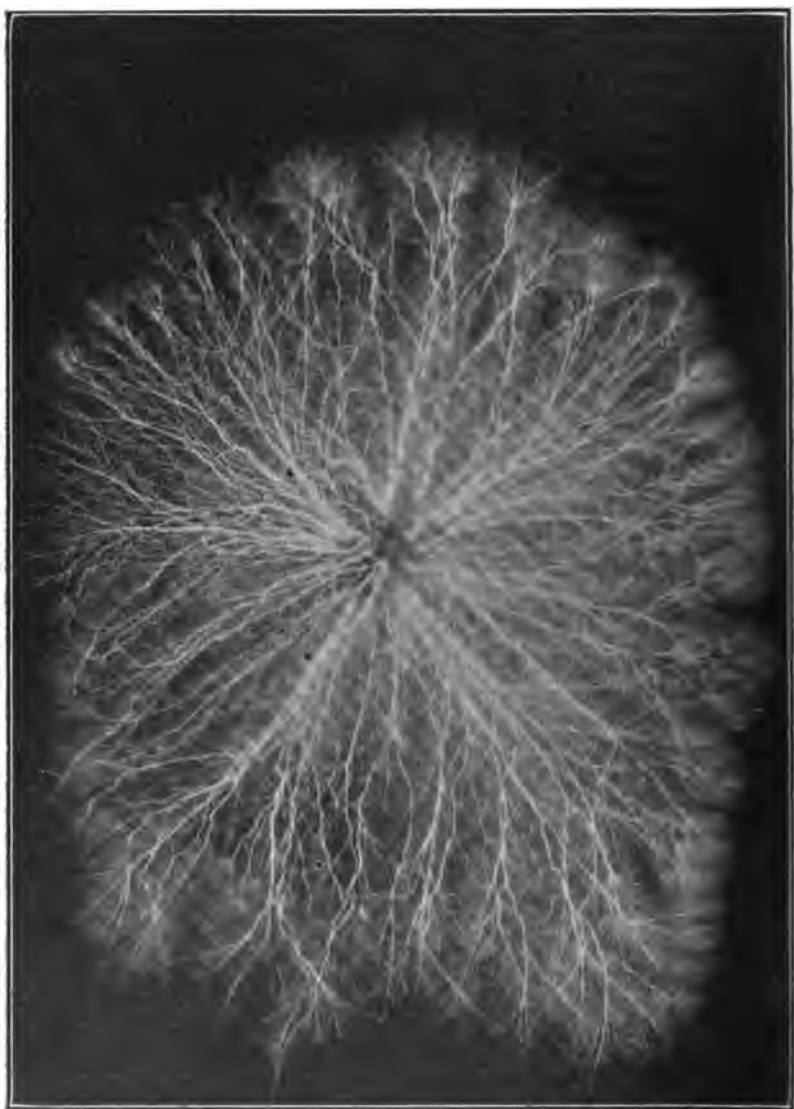


Fig. 4.—Tesla.

traceable owing to the brown iodide color. It was interesting to note, that with an electrode on either side of twenty thicknesses of blotting paper (1) the high-frequency spark acted on the pot. iodide throughout. (2) That the D'Arsonval re-



Fig. 5.—Spark Indirect—Negative.



Fig. 6.—Indirect Spark.

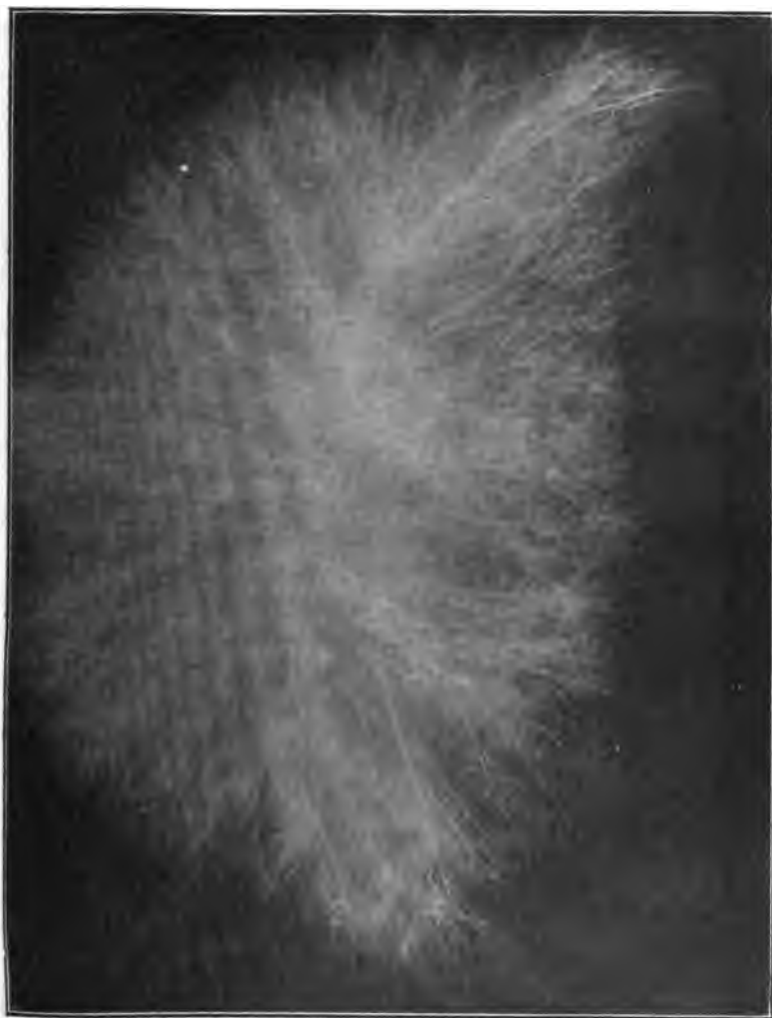


Fig. 7.—Oudin.

acted most, nearer both poles. (3) That the solenoid-condensers of Morton and the Tesla were more deeply penetrative.

It was not determined that either the positive or the negative end of the spark in the different instances was the more penetrative.

Following the clues given as to penetration the writer has been treating tuberculous glands in this way by placing a

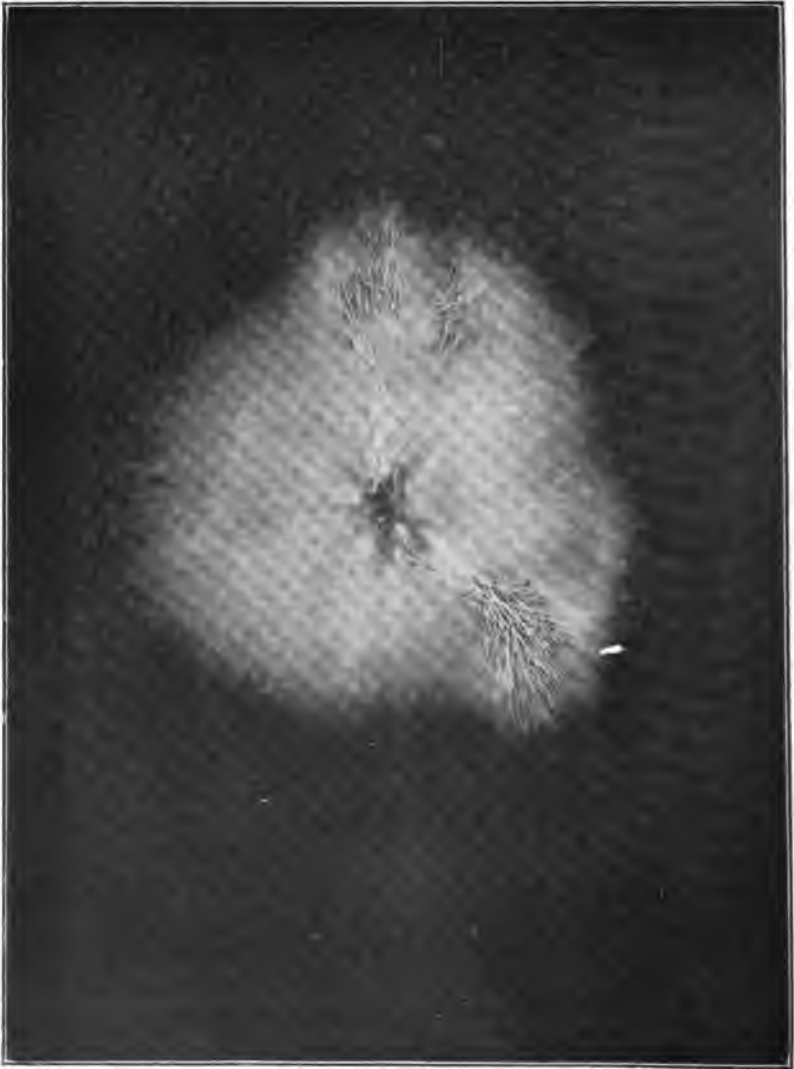


Fig. 8.—Static Induced Spark.

vacuum electrode over the affected gland and grounding the opposite side of the body nearest to the electrode. The results are astonishingly good, the recession of the glands taking place much more rapidly than under the X-rays.

19 East Twenty-eighth Street.

STATIC ELECTRICITY.

BY JOHN H. BURCH, M. D., BALDWINVILLE, N. Y.

Member of the American Electro-Therapeutic Association, First International Congress of Physical Therapeutics, Syracuse Academy of Medicine, Onondaga County Medical Society, etc.

(concluded from page 129)

These observations would lead one to believe that little dependence is to be placed upon normal blood pressure findings as a clinical guide in the application of this modality. Yet a large number of tests in other conditions have led me to believe that, as a rule, a lowered blood pressure is an accurate indication for the employment of the Morton wave-current, the only exception that I have found being arterio-sclerosis with renal insufficiency, as is manifested by a decrease in the normal output of urea.

The following is a typical case, of several others, in which I have found the Morton wave-current of inestimable value.

H. Q., æt. thirty-one. Occupation, plumber. Family history, excellent. Has always enjoyed good health until two years ago he suffered from an attack of spinal neurasthenia, brought on by overwork. He rapidly recovered from this attack and remained in perfect health until July, 1905. He was then overcome by the excessive heat and was confined to his bed for several weeks with what was diagnosed as meningitis. His recovery from this attack was only partial. He suffered from a continual sensation of throbbing and fullness in the occipital region and undue excitement or overwork would cause him to suffer from most excruciating pain in the occipital and upper cervical regions. He at times would lose consciousness during these seizures. The duration of the attacks was from four to six hours. I first saw him October 2, 1905. A careful examination revealed normal reflexes and pupillary reaction. There was absence of Kernig's sign, there was no retraction of the head, nor could I find contraction of the cervical muscles or points of spinal tenderness. The thoracic and abdominal organs were normal, and an examination of the urine revealed no abnormality. There was also a diminished arterial tension, it being only 120 mm. with a two-inch armlet.

Notwithstanding the fact that there was neither contraction of the cervical muscles, points of spinal tenderness, or displaced atlas, I began the treatment of this case by means of mechanical vibration. The first treatment brought on an attack of pain that caused my patient to pass a most wretched night. He came back the next day exhausted from the effects of the treatment. His blood pressure at this time was only 110 mm. I asked him to sit upon the platform, a long spinal electrode was carefully adjusted over the entire length of the spinal column and was attached to the positive side of the static machine, the negative side being grounded. The spark-gap was gradually lengthened until he was able to bear without discomfort a gap of six inches. The duration of the séance was twenty minutes. As he stepped from the platform I again tested his blood pressure and found it to be 130 mm., a gain of 20 mm. He felt much better and continued to improve. He now works ten hours daily, with no return of his trouble. He received in all six treatments.

To demonstrate the difficulty of accurately selecting the proper modality for a given case, I will report the following clinical history, that is apparently in many respects similar to the case above reported.

Miss N. E., æ. thirty. Occupation, school teacher. Her mother has always been a neurasthenic, as well as her only sister. Her maternal grandfather died of paralysis at the age of sixty years. From childhood she has suffered from a severe pain in the upper dorsal region on the right side of the spinal column. There have never been points of spinal tenderness upon pressure, although deep pressure for a time relieves her pain. Shortly after puberty she suffered from severe vesical irritation that was accompanied by frequent desire to urinate, followed by very painful tenesmus. This was always aggravated by excitement and never troubled her at night. It became worse as she grew older until she became almost a wreck physically and was obliged to give up her work as teacher. She consulted several physicians, who advised the removal of the ovaries, hoping that by so doing she might find relief, as the condition was thought to be an ovarian reflex. One ovary was removed, together with the greater part of the other, five years ago. This did for a time seem to relieve her. In a short time, however, the vesical irritation was substituted

by the former pain in the back, that became almost unbearable. The pain at times was so intense that she became unconscious. She came to me in March, 1905. I found her extremely anemic and almost a physical wreck, although a careful examination failed to reveal any marked abnormality except a slight trace of indican in the urine as the result of constipation. A very careful examination of the spine failed to reveal any abnormality. There were neither tender points, muscular contraction, or bony deviations. Yet pressure on the right side opposite the 2d, 3d, and 4th dorsal vertebræ relieved her pain. I began treating her by means of vibration. Each treatment aggravated her condition and caused her to pass a restless night. I examined her arterial tension several times, and found it to average 170 mm. (narrow armlet). Notwithstanding this high blood pressure there was no evidence of arterio-sclerosis, as the output of urea was normal. After failing to relieve her by means of mechanical vibration, I resorted to the Morton wave-current. The long spinal electrode was employed attached to the positive side of the machine, the negative side being grounded. Each treatment aggravated her pain and after the third séance she was obliged to remain in bed for twenty-four hours. She was then treated by means of d'Arsonvalization. This modality relieved her at once, and she is at present gradually improving.

These two cases were similar in many respects, yet one presented a lowered arterial tension and was relieved by means of the Morton wave-current, while the other showed a persistent rise of blood pressure and was aggravated by this modality. Thus far I have never failed to relieve this class of cases, accompanied with a lowered arterial tension, by means of the Morton wave-current. It seems to recharge, as it were, the fagged and weary cells with increased activity. I have also treated many similar cases with normal arterial tension by means of this modality with success.

Referring again to our experimental work: "To the next group was given positive insulation. In fifteen of the twenty tests there was a rise of blood pressure averaging 5 mm. In four there was no appreciable change, and in the remaining one a slight fall of 3 mm."

From these findings this modality would seem to be indicated in conditions similar to those in which the wave-current

is employed. This, in fact, has been my experience with this modality. I have of late had several patients whose conditions were apparently aggravated by the wave-current, that improved with marvelous rapidity when subjected to positive insulation. These cases were mostly neurasthenics who presented no localized manifestations, but who suffered from general malaise, nervous and physical exhaustion. In every instance there was a subnormal blood pressure, and usually cold hands and feet with mental apathy. In the cerebral type of this disease I have found the crown breeze a valuable adjuvant in connection with positive insulation. In most of these cases, however, a local condition will be found indicating the employment of the wave-current with a metallic electrode over the affected area. It is only in exceptional cases that I have found simple insulation to be of greater efficiency.

Negative insulation is also a modality worthy of consideration. If I may be again permitted I will quote our experimental results with this method. "The next group received daily séances by means of negative insulation of fifteen minutes' duration. In nineteen of the twenty tests there was a fall of arterial tension averaging 3 mm. I also made observations on several neurasthenic patients accompanied with vascular excitement and temporary exaggeration of blood pressure. In every instance there was a relaxation of the blood pressure following the application."

It has been my fortune since the above was written to have treated a very interesting case of neurasthenia by means of this modality.

Mrs. V. F., æt. forty-five. Came to me March 6, 1905. From what I was enabled to learn of her family history, her mother was an neurasthenic, as is also her sister. She is a neuropath always prone to worry over trifles and exaggerate slight abnormal sensations. She has never suffered from an acute disease, is the mother of four children, each birth having been normal. About a year ago she began to experience menstrual irregularity with its accompanying vasomotor disturbances, manifested by hot flashes, throbbing in the head, and various other abnormal sensations that were exaggerated to the extent that she thought herself to be suffering from a serious organic disease. She became very despondent and could be made to think or talk of nothing except her manifold

abnormal sensations. When I first saw her she seemed to be rapidly drifting into a state of acute melancholia. A very careful physical examination revealed nothing except an increased arterial tension that I felt sure was functional, as the heart and kidneys were normal. The average blood pressure after several tests was 190 mm. Other measures failing, I advised static electricity. I began with the Morton wave-current. The result was far from satisfactory. Every abnormal sensation that she had heretofore experienced was aroused to vie with one another for demoniacal supremacy. The arterial tension was increased 15 mm. at the termination of a séance of fifteen minutes' duration. She was unable to sleep for several nights, and it was with no little difficulty that I persuaded her to return for further treatment. At the next séance I resorted to negative insulation, basing my selection of this modality upon the increased arterial tension. The result was almost magical. When she stepped upon the platform she was a fit subject for a madhouse, when she left it after a treatment of twenty minutes' duration she was absolutely free from abnormal sensations. The blood pressure had fallen 27 mm. She slept that night, and has since continued to improve until at the present time she is apparently well.

This is but one of several observations of a like character. While the sphygmomanometer may not be a specific guide in the selection of electro-static modalities, I am convinced that the above referred to experiments with these quiet electrical discharges are of great value in the selection of the method to be employed in a given case. It at least aids us to base our selection of modalities upon a physiological foundation that may be demonstrated rather than presumed.

Our experimental work with the Morton wave-current with negative insulation has been very unsatisfactory. I have made a large number of observations with this modality with results most perplexing and contradictory. It will at one time cause a distinct rise of blood pressure and at another séance a distinct fall of the arterial tension. Clinically, I have also experienced the same contradictory results. It certainly is a distinct modality and differs in its physiological effects from the wave-current as ordinarily employed with positive insulation. In the therapeutic application of this modality I know of no other guide than empiricism.

It was found that both the disruptive and convective static discharge produce a marked rise of the arterial tension, and, apparently, without regard to the polarity employed.

The spark and spray are the oldest and perhaps the best understood electro-static modalities. While we at present know but little of the exact physiological action of either, we have learned by the empirical use of the spark that it in some subtle manner profoundly affects nutrition and metabolism. While the Morton wave-current relieves stasis and imparts a normal vasomotor tone to the affected region over which it is applied, the action of the spark is still more profound in its effects upon nutrition and the metabolic changes of the tissues. It not only relieves stasis, but by its use exudates are absorbed and a renewed vasomotor tone is imparted to the affected structures. It increases cellular activity in dormant organs and awakens segmental spinal centers to send and receive with increased alertness their manifold stimuli. My own experience with this modality has led me to believe that the only polar difference there is in the spark is intensity. The indirect positive spark with negative insulation is certainly by far less painful than the indirect negative with positive insulation, although the latter may, perhaps, be more penetrating in its effects.

With the spray, however, there certainly is a decided difference in the therapeutic effects of the indirect negative and positive discharge. While both cause a rise of blood pressure, I have many times observed that the indirect positive spray with negative insulation is by far more soothing, producing a sedative effect, while the indirect negative is more irritating and efficient where a distinct counter-irritant is desired.

In a communication presented before the Syracuse Academy of Medicine, May 5, 1903, I described a method of employing the static spray direct from the machine without the use of the platform. The method consists in attaching one end of a flexible rheophore to a metallic ring that may be readily slipped over one of the discharging rods, while the other end is connected with the spray electrode. In using this modality the plates are caused to revolve at the speed desired, the metallic ring is attached to the discharging rod of one side of the machine, while the opposite side is grounded. The patient sits upon an ordinary stool or chair placed upon the floor and

receives the effleuve direct from the machine without the platform. I have used this modality very often during the past three years and have come to look upon it as a very valuable method where the employment of the spray is demanded. By its use a hot and powerful effleuve may be applied directly from the side of the machine desired. There is less danger of sparks and it may be directed with greater facility to the affected area. The polar effects of this modality are distinct and clearly defined. From the negative side of the machine a soothing sedative spray may be obtained that relieves hyperesthesia and nervous irritability, while that from the positive side is distinctly stimulating, being a powerful counter-irritant awakening dormant cutaneous reflexes that carry their increased stimuli to their respective segmental centers in the spinal cord and thereby enhance the nutrition and innervation of the distant organs over which they preside.

While the physiological effects of quiet electrical discharges are perhaps largely due to their action upon the vasomotor nervous system, we are not justified in basing the clinical application of these modalities wholly upon the experimental findings of the sphygomanometer. Empiricism and clinical experience are, after all, the most important factors in our present system of therapy, and it is only with the hope that these observations may aid in the clinical application of these valuable electro-static currents that they are submitted.



ELECTRIC LIGHT IN THE TREATMENT OF
SYPHILIS.*

BY H. FINKELPEARL, M. D., PH. G., PITTSBURG, PA.

As syphilis, which is one of the most dreaded diseases flesh is heir to, is becoming more prevalent, any new remedial agent, whether it comes with the claim of being a perfect cure, a relief of certain symptoms or an adjunct to the old and well tried remedies, it is hailed by the syphilologist as a welcome guest in the field of the therapeutics of syphilis. The latest arrival with strong claims for an important position in the therapeutics of syphilis is the energy of light.

Although the reporters on the light treatment of syphilis are few and statistics on this subject rather meager, the fact that the reports come to us from such eminent authorities as Cleaves, Kellogg, Strebel and others, should be sufficient to encourage the medical profession to give electric light a fair test in the treatment of this formidable disease.

Dr. Margaret A. Cleaves in her work on the energy of light speaks in glowing terms of solar and electric light as a curative agent for syphilis. The same author reports a severe case of tertiary syphilis, which resisted the mixed treatment, X-ray and brush discharge, but yielded promptly to the combined use of both arc and incandescent light. Dr. Kellogg in his work on rational hydrotherapy claims for incandescent light baths great virtues in the treatment of syphilis, particularly in the third stage.

Dr. Strebel reports good results from the use of ultra-violet light in the treatment of primary syphilitic sores and gummata.

Dr. Below of Berlin reports a number of cures of syphilis by means of the electric light bath.

The encouraging reports above cited and others met with in medical literature led me to install an outfit consisting of one cabinet for the administration of arc light, and one for incandescent light baths. Feeling that we have not sufficient data on this subject to justify us in risking the future welfare of our patients by relying on electric light alone for the com-

* Read at the Fifteenth Annual Meeting of the American Electro-Therapeutic Association at New York, September 20, 1905.

plete cure of this disease, I thought it best, for the present at least, to use it only in conjunction with, or as an adjunct to, the standard remedies, and compare the results of treating syphilis by drugs alone with the results of treating by drugs plus electric light. Only cases with undoubted diagnosis of the disease were selected for the comparison. The number of patients treated by light from November 1, 1904, to September 1, 1905, were 32. Time of each exposure ten to thirty minutes, repeated every two, three or four days. The incandescent cabinet contains three rows of thirty-two candle-power lights, each row containing six lights, and three rows of sixteen candle-power lights, each containing six lights. The arc cabinet contains two lights of six amperes each taken from the alternating current.

The following five cases represent a fair average of the thirty-two cases treated by the combined method.

CASE I.—F. D., merchant, aged thirty-two. Contracted syphilis in 1898. In his case the cutaneous manifestations had always been the most annoying. It seemed as if the entire virulency of the disease was concentrating its powers on the skin. His face, neck and particularly his back, were covered with cutaneous gummata ranging in size from a pea to a twenty-five cent piece. The lesions were so large that he could not recline in a chair or sleep on his back and the wearing of collars was uncomfortable. There was also, a stubborn tertiary lesion on the dorsum of the genital organ. The usual local applications were of no avail. The iodides were increased, decreased and discontinued without any influence on the number and size of these tertiary cutaneous lesions. A course of baths at the sulphur springs of Mt. Clemens had almost no effect. The local applications with a glass vacuum electrode from a static machine seemed to be of some benefit. The electric light treatment was instituted on December 3, patient taking twenty minutes of incandescent light bath. Three days later he took the same for thirty minutes. On his third visit, December 10, patient showed some improvement, when he was given twenty minutes of arc light, followed by twenty minutes of incandescent light bath. A few days later he reported that he could lean in a chair or lie on his back at night without any discomfort, although he could, as he termed it, "still feel some projections."

After a total of fifteen incandescent and six arc light baths covering a period of two months, the skin cleared up entirely. I see the patient frequently in his place of business and am assured that there is no sign of any relapse. This is the only case that received no drugs since this form of treatment was begun.

CASE II.—M. M., female, aged twenty-seven. Contracted syphilis in October, 1903. Had been under the care of a physician and took her medicine faithfully. She consulted me in March, 1905, for very troublesome lesions of the mucous membrane of the mouth, pharynx and tongue. They were so extensive that speaking was difficult and painful, and eating, as she expressed, "was simply agony." Her gums were very tender from being salivated most of the time. On her first visit to my office she was given fifteen minutes of incandescent baths and was ordered to continue her mouth wash but discontinue the mercurials for three days. At the next visit which was three days later, she was given twenty minutes of incandescent baths, and from that time on, twenty minutes every two to five days until twelve incandescent baths were taken. The mercury by the mouth in tonic doses was resumed after the second bath and kept up constantly without intermission. The mouth lesions began to show improvement after the second bath and continued doing so until entirely healed by the ninth bath. The ptialism disappeared entirely after the third bath and patient has not been annoyed with it since. She was not regular in the taking of her light treatment but assured me that she took her mercury faithfully. It could, however, be noticed that the improvement in the mouth lesions was in direct ratio to the regularity and frequency of the radiant baths taken. When last seen about the first week in July she was entirely free from symptoms. As she left for Europe a few days later I have not seen her since.

CASE III.—G. B., male, aged twenty-three. Iron worker. Contracted syphilis in January, 1905. The eruption which appeared a few weeks later was of a papulo-postular and squamous character. All the glands were very much enlarged, the entire buccal cavity was covered with ulcerating patches. Mastication and deglutition were very painful. He was immediately put on incandescent baths followed by inunctions of

mercury after each bath. He was also given yellow iodide of mercury by the mouth. The usual local remedies were applied to the mouth lesions. The eruptions over the body disappeared entirely after ten days, during which time he received three radiant baths. The inguinal and other glands receded promptly, but the pharynx remained rebellious to treatment till about August 1, in spite of increased doses of mercury by the mouth, by inunctions, hypodermatically and fumigation in conjunction with a series of both incandescent and arc light baths. I accused my patient of taking alcoholic stimulants contrary to my orders, which he denied emphatically. At the present time his mouth and throat lesions are entirely healed. I attribute the slowness of the recovery in this case to the patient's hygienic conditions and to the ingestion of alcoholic stimulants, which I strongly suspect in spite of his denials.

CASE IV.—I. S., merchant, aged thirty. Contracted syphilis in January, 1905. He did not consult a physician till May. When first seen, he had a very large, angry-looking sore on his genital organ. The inguinal glands were enlarged on both sides, with suppuration on the left side. There was an eruption on the abdomen and thighs. I diagnosed this case as a mixed affection. The bubo was incised and the patient given twenty minutes of incandescent bath every three days. An ordinary dose of yellow iodide was also given three times daily, both the chancre and the incised wound healed in about three weeks. The eruption disappeared in a few days. With a healing of the wounds the patient discontinued all treatment. I have seen him several times since, but owing to absence of symptoms as well as common-sense, he could not be persuaded to take treatment of any kind.

CASE V.—A. W., female, aged twenty-four. Contracted syphilis in 1900. Was treated by the writer for about six weeks. As soon as the initial lesion was healed, the patient left the city, and paid no more attention to her malady. In August, 1904, she suddenly became very hoarse, and a few days later her voice was almost completely lost. She consulted a physician in her own town, who correctly diagnosed and treated the case for tertiary syphilitic laryngitis. After almost three months' treatment, she became discouraged, and left her physician; she came to my office in December, 1904. I advised her

to continue the same medicine which she had been taking, and suggested an incandescent bath every second day. After the second bath, her voice became less husky and more audible. Some improvement was noted after each radiant bath, and after the seventh bath her voice was completely restored. She again abandoned treatment. When accidentally seen in June, her voice was normal and her general condition so good that she could not be persuaded to take a little treatment to ward off future trouble. On August 17, she was suddenly stricken with a left-sided hemiplegia. On the following day she was brought to my office in a cab accompanied by a friend, whose assistance was indispensable for her in walking and dressing. After reprimanding the patient for her former negligence, she was advised to take an incandescent bath every third day and a mixture containing one-sixteenth of a grain of biniodide of mercury and thirty grains of iodide of potassium three times daily. After the third bath she was able to come to my office on the street car without any assistance. After three weeks' treatment, during which time she received six radiant baths and eight applications of the Morton wave-current to the affected limbs, she has improved so much that she is able to do part of her housework. While she still drags her left leg along a little she can walk without support or assistance. The grasp of the affected hand is fair, and she can use it in adjusting her hat. She is still under treatment.

Comparing the results of the cases just reported, also other cases which I treated by light or drugs and light with those treated by drugs alone, I can summarize my experience as follows:

1. That the cutaneous symptoms disappear more rapidly by the application of the combined arc and incandescent light baths, and that the traces on the tissue are less marked where light is used.
2. That albuminuria and affections of the joints met with in the secondary stage are removed quicker by the incandescent light bath.
3. That the enlarged glands diminish in size more rapidly under light, and that the pain of enlarged inguinal glands is very much relieved by the use of the glass vacuum electrode.
4. That although the patients who receive light seem to improve under smaller doses of mercury, they can take larger doses of the drug without being salivated, and that an already

induced salivation is rapidly removed by from one to three incandescent light baths.

5. That the general health of the patient is much better when the patient is given radiant baths than when given Turkish or hot tub baths for eliminative purposes.

6. Although blood counts were not made, it was observed that the patients looked less anemic when the arc light bath was given.

7. That the effects of mercurial inunctions given immediately after a radiant bath and mercurial fumigation given while the patient is in the electric light cabinet, are decidedly greater than when given in any other manner.

Discussion.

Dr. Cleaves: Dr. Finkelpearl will not mind me stating that he is one of my students and I am more than pleased that he has put his knowledge to such excellent account. I had not the opportunity of treating the variety of syphilitic cases that he had, but I had a bad case of tertiary syphilis. The lips were swollen and the bridge of the nose was gone, as if bitten off by something. She had been having mixed treatment, but did not get any better. I treated her by means of a small iron electrode lamp, which gave a great quantity of light energy. There was an improvement after the first treatment. There was an improvement in the color, and the sloughing began to heal. Applications were made twice a week and under compression, so as to make the parts bloodless, and that the energy of the light might penetrate more strongly. After three weeks she had no more sores. I also threw the light up through the nares from a marine searchlight to facilitate the healing of the disease of the nose. She made a perfect recovery.

I do not see these cases often, but they interest me very much, because here and there you find that the exposure of syphilitic cases to the action of light gives good results. We need something that has a strong oxidizing action. As to drugs, I did not think myself justified in denying mercury. It is the oxidizing action of the light evidently that exercises the favorable influence.

Dr. Phelps: In this particular case, where there was a lesion, I should want all the chemical energy I could get. In the cases of systematic conditions of skin eruptions, which Dr. Finkelpearl described, I believe that, if we combine constitutional treatment with the application of incandescent light, the result will be better.

A Question: Is there any other effect besides?

Dr. Phelps: Yes, there is a very strong chemical effect. With the incandescent light there are no ultraviolet rays; only blue violet rays. I should want an arc light to fix the medication.

Editorial.

THE DIFFERENTIAL EFFECTS OF PHYSICAL METHODS IN THERAPEUTICS.

THE study of the indications of the different physical modalities in the treatment of various conditions is engrossing the minds of the profession more than ever before in the history of physiotherapy. Formerly it was the custom to make specialties of the various physical methods, as hydrotherapists, electrotherapists, and kinesiotherapists.

It is now evident to the physician who understands and would be generally successful in the treatment of the numerous conditions as they arise in his practice that he must be familiar with several or all of the physical methods. It is not uncommon in the experience of the operator who is familiar with the various indications and the employment of different methods, that in the management of many cases he will employ more than one modality. The average operator, however, at the present time and with general want of familiarity with these methods, is ill-prepared to select from the different modalities the one best calculated to meet specific indications; and a wide difference of opinion, as well, often exists in the minds of experienced operators as to the choice of measures.

In a general way it is found that the physical modalities produce two sorts of mechanical effects, one extrinsic, in which the vibrations induced in the tissues are dependent purely upon mechanical effects, which throw the cells into activity without otherwise influencing their form or natural characteristics, while the other, intrinsic in action, induce in the tissues marked contractions and changes in condition peculiar to the influences of the agent employed and marked by a persistence of effect not characteristic of the effects of the modalities which act extrinsically. One sort vibrates the cells, the other causes cells to vibrate themselves.

The two types are essentially mechanical, but distinctly different in their after effects upon the conditions treated. For example, the application of massage—extrinsic and passive—induces temporary relaxation and expression of the fluids, but is superficial and relatively ineffectual in influencing either metabolic changes or the removal of congestive processes; while the modality that acts intrinsically, causing the cells

and tissues themselves to contract, thereby inducing inherent activities, and by penetrating to the deeper structures not only influences local metabolism to a marked degree, but when employed to an extent short of producing fatigue leaves the structures depleted of extraneous matter and in a tonic condition. This is clearly demonstrated in the action of the static wave-current, in the treatment of prostatitis and other acute and subacute inflammatory conditions. Radiant light and heat produce two different effects, depending upon the method of application. Radiant light and heat employed at moderate temperatures produce relief from pain by inducing local relaxation, thereby relieving pressure conditions where congestion is present, while the prolonged application of radiant light and heat of greater intensity induces contraction of the arterioles and tissues, removing congestion and pressure by depletion, as do the wave-current and static sparks only to a less degree, and affecting only the more superficial conditions. Applied in the early stages of inflammatory conditions, not too deeply situated, these modalities are effective in aborting and relieving inflammatory processes. In the later stages, when exudation and infiltration have taken place, these modalities possess too little energy to effect the requisite elimination of the products of inflammation. It is in those cases that the administration of the static spark or other electrical modalities which produce deep and energetic tissue contraction and active local metabolism are influential by their intrinsic action in inducing an energetic tissue change which will effectively promote the removal of the accumulated products of the inflammatory process.

Procedures which act upon the reflexes or by stimulation of the centers themselves, are capable of influencing variations in the blood supply, either increasing or diminishing it according to indications. Methods by hydrotherapy, massage, mechanical vibration, light, static friction sparks and other electrical modalities are capable of producing in varying degrees those effects, increasing local vascularity—delivering the blood to one location, thereby relieving other areas of congestion, or by inhibition, inducing local depletion.

Another effect of these modalities is upon septic or infectious processes. These may be wholly or largely removed according to indications, either by increasing local phagocytosis, by

inhibiting the activities or procreation of the germs or by direct destruction of the germs themselves.

All of the modalities which increase local hyperemia are capable of increasing local phagocytosis.

The X-ray alone seems to possess the quality of inhibiting the procreative functions of germ species. The extent of its action in this respect is, however, still an unsettled problem.

High potential vacuum tube discharges and light of all frequencies are the modalities *par excellence* for destroying the germs *in situ* either by the external administration or the induction of fluorescence in the tissues. Germs which are susceptible to the ultra-violet rays of the spectrum in dehematized tissue are destroyed by their influence.

The election of modalities is an important matter, and time and experience will ever improve each physician's success in their adaptation and in this as in everything pertaining to professional skill the *personal equation* is an important factor.

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THE ORGANIZATION OF LOCAL ASSOCIATIONS OF PHYSICOTHERAPAY.

THE step taken, as noted in the previous issue of the JOURNAL by the physicians of New England in organizing a local association devoted to physiotherapy is highly commendable.

The resolution offered by Dr. Eaton, secretary of the New England Electro-Therapeutic Association, at the last meeting of the association encouraging the adoption of local associations in affiliation with a parent society was adopted, and this new association is the outcome of the enterprise of the New England members under the leadership of Drs. Morse and Eaton. It is hoped that similar organizations will be formed in every State or community where a sufficient number of physicians interested in these subjects can be brought together as by this means the literature on these important methods will be greatly enriched and the attention of the profession at large called to their value.

The extension of the knowledge of a *virile therapeutics*, freed from the superstition of the alchemists or the astrologists of old, is the growing tendency of the age—the natural outcome of the results of research in the fields of pathology and diag-

nosis. It is said of so many members of high standing in the profession that they are excellent diagnosticians, but not successful therapists. This could not be the case if, with the rational knowledge of disease, they were capable in the employment of a *rational therapeutics*. The employment of agencies which mechanically restore functional activities by removing the products of poor metabolism and restore activity to the parts of the organs whose functions are impaired requires the employment of mechanical measures, and such we must consider those included in physical therapeutics.

The promulgation of these principles is, to a considerable extent, a labor of self-denial and against the opposition of the unenlightened that renders difficult the extension of the knowledge of *modern therapeutics*. The opposition which confronts the leaders in physiotherapy are the members of the profession who are practicing in ignorance of their value and are not willing that light shall shine in. Such a spirit is ignoble and unworthy of the present age, and those who shall continue to resist must ere long suffer from their mistake.

An organized effort is certain to crown the labors of those who have the courage of their convictions with success. It is a fight for the relief of the suffering and will certainly triumph. May the movement grow and local societies be organized wherever a few earnest workers can be brought together.

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PROPOSAL FOR A SUBDIVISION OF THE FOURTH SECTION (SECTION OF THERA- PEUTICS) OF THE INTERNATIONAL MEDI- CAL CONGRESS INTO THREE BRANCHES.

Prof. C. Colombo, of the Faculty of Medicine in Rome, respectively calls attention of the Executive Committee of the Congress to Section IV., and suggests the adoption of a more definite title of the Fourth Section called the Section of Therapeutics and Pharmacology.

He calls attention to the fact that the Executive Committee, in selecting this title, were probably of the opinion that "therapeutics" and "pharmacology" are not at all the same thing.

"We know," he says, "of course, what 'pharmacology' is;—it is the study and use of pharmaceutical medicaments to a curative end."

"Then, by a process of exclusion, the word 'therapeutics' must include all other curative means."

He adds: "Would it not be better to specify these other curative means, which are not less important or less numerous than those which come under the head of pharmacology?"

"In the front rank we have the *physical agents*; *hydrotherapy*; *balneotherapy*; *thermotherapy*; *electrotherapy*; *kinesiotherapy* (*massage and medical gymnastics*); *mechanical orthopedics*; *phototherapy*; *radiotherapy*; *pneumatotherapy*, and *inhalations*; *climatology*; *dietotherapy*, and numerous others which can neither be ignored nor neglected to-day."

"Neither can we neglect *organic therapeutics*—that which utilizes to a curative end liquids or other substances extracted from living organisms; a science which itself includes numerous applications, of which those that concern serumtherapy are so much discussed at present that I need not emphasize their importance."

"*Opothrapy* also is highly valued at the present time, and in the same way as *serum therapeutics* has no connection with pharmacology.

"*Rebus sic stantibus*, imagine a section in which a *hydropath* discourses on the technique of douches, of the action and reaction of cold water, or of the degree of heat necessary to produce diaphoresis of the third degree—to an audience of pharmacologists who know nothing of the subject! And imagine, also, bacteriologists describing the modes of fabrication and administration of a serum in presence of a like heterogeneous assembly!"

"There is but one way to avoid the numerous inconveniences which would result without doubt from such a situation, and that is to subdivide the Fourth Section into three branches—as has already been done, with less necessity in the Twelfth Section—and to bring together in each only the specialties of each of the three great subdivisions of Therapeutics, viz.: *Pharmacological Therapeutics*, *Physical Therapeutics* and *Organic Therapeutics*, giving to the Fourth Section the title of:

"Section of Therapeutics"

- (a) Pharmacotherapy
- (b) Physiotherapy
- (c) Organotherapy } Serumtherapy
 } Opothrapy

"If, in objection to the foregoing considerations, the Executive Committee think that *Serum-therapeutics* might be included in the Fourteenth Section—Hygiene and Epidermiology—(and then where would Opotherapy go?), it would still be rational and scientifically opportune to subdivide Therapeutics into at least two branches: *pharmacological and physical*."

"I submit these brief considerations, which, however, bring forward a very important question, to the attention and to the enlightened judgment of the Executive Committee, begging them to be good enough to deliberate on the question before the reunion of the Congress, so that the numerous specialists on Physical Therapeutics may meet in homogeneous and competent society, as is the case in every other section."

The attention called by Prof. C. Colombo to this apparent oversight of the Executive Committee is well advised in that the line of the advanced ideas have not received sufficient recognition from the profession at large. It is sincerely to be hoped that the clear presentation of reasons given by Prof. Colombo will receive the attention of the Executive Committee, and that it is not too late to make the subdivision suggested and thereby avoid the awkwardness of the situation in which the various lines of investigation would be otherwise embarrassed. The time has come when a consideration of these various therapeutic procedures and their importance to the profession will be recognized in all of the coming congresses and meetings of national associations, such as the American Medical Association.

At the last meeting of the American Medical Association an effort was made in behalf of the establishment of a section of physiotherapy, which was denied. We cannot believe, at the coming session of the association, the sober and sensible councils will not prevail and the seeming prejudice against the advancement of the scientific employment of physical agents be accorded their proper recognition. EDITOR.

Progress in Physical Therapeutics.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

Leprosy in the Philippine Islands, with an Account of Its Treatment with the X-ray. By H. Brookman Wilkinson, M. D., Physician in charge, San La Zaro Hospital, Manila, P. I. The Journal A. M. A.

The writer gives minute details in proving his cases in order to eliminate all error in his report, but as few who will read this are interested or know much of leprosy, we will therefore consider only that part of this valuable production which is of special interest to X-ray workers.

He reports thirteen cases of undoubted leprosy, seven of whom were greatly benefited, three were cured, and three were not improved by means of the ray.

The three cases not improved by the treatment were cases in which there were not any large or extensive deposits of lepra nodules or ulcerations, but were few and scattered about over the body in such a manner that only a few of them could be reached at a time in treatment.

The treatments were begun in 1904. He always selected the part of the body where the greatest amount of lesion could be covered by the treatment or exposure, which were usually given for about ten minutes with the anode at a distance of from seven to ten inches.

The effort in treatment was to always approach an effect as near to burning of the skin as possible, without doing so.

In only two cases was the skin actually burned and they were the first to be reported cured.

Case 5.—Began treatment by means of the ray in July, 1904. The case was cured of his leprosy but died one year later of atrophy of liver with general anasarca, but before death nor at the autopsy could any leprosy bacillus be found.

Case 12.—Case of hypertrophic leprosy, of two years' duration. The X-ray was given to the right side of the face and ear at a distance of ten inches and applied on January 9, 10, 11, and 12, 1906, when a small blister was noted on the cheek near center of the exposure, which enlarged to the size of a thumb-nail and scabbed over. X-ray treatment had been transferred to the large area on the back. Some portions of the part of face first treated showed some fading of color and reduction of elevation, while one spot on the forehead which had not been treated at all directly, had been reduced very perceptibly.

January 31. Patient had been treated in all seven times and showed marked reduction in cutaneous manifestations of leprosy, not only at the points treated, but to just as great an extent on parts of the body most distant from points of application.

July 1. There had been a wonderful improvement in all of the leprous manifestations of this patient in the last five months, during which time he has had seventeen applications of the ray. All the elevated, dark-colored spots on the face and body had disappeared and were replaced by slightly depressed, light-colored, scar-tissue, like spots, which were slightly striated and drawn like newly formed connective tissue.

The deformity of the fingers had disappeared except in the little fingers where it was markedly decreased, while the defect in the muscles of the legs had entirely disappeared and he walked naturally. From July to the last of September, 1905, many microscopic examinations were made of scrapings from the old foci of disease for the *lepra bacilli* all of which were negative and the case is pronounced cured and is apparently well.

Case 13.—Apparently well after fourteen treatments.

How does the X-ray treatment operate? "I am inclined to believe that when a local lesion of leprosy is treated with the X-ray, the organisms there localized are killed and their bodies are absorbed into the system, thereby producing an immunity of the system against the living organism. This as may be seen would be practically analogous with the immunization of individuals against bubonic plague by injecting them with killed cultures of plague organism. In our case we simply grow the *lepra bacilli* in the human body as a culture medium and then kill them by means of the X-ray."

In support of this theory he cites the following facts:

"First: The treatment of one spot upon a patient (leprous) produces improvement in spots at a distance from the one actually treated.

"Second: The cure in the distant spots seems to progress parallel to and to be just as complete as the one treated.

"Third: The best results seem to have been obtained only when treatment is pushed to the point of killing the tissues, which would also probably be the point of killing the organisms.

"Fourth: Cases in which there are massive localized leprous deposits as in Case 5, are most rapidly improved. As in these cases, we have an abundant culture on which to operate and thereby produce immunity more rapidly.

"Fifth: In diffuse general involvement of slight degree or atrophic character where there are only a few scattered organisms we have had little success.

"Sixth: In two well advanced cases in which the amount of new leprotic tissue was excessively great, the improvement

was marked and rapid, but followed by loss of general health and rapid physical decline. This may have been from overdosage, so to speak."

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

Ocean Bathing. By Philip Marvel, Jour. A. M. A., April 8.

In considering some of the advantages and disadvantages of sea bathing, Marvel says one must not lose sight of the fact that it is impossible to separate them from the influences of other agencies, such as temperature and the physical conditions of the atmosphere. In nature's operations, heat and cold are as necessary as they are wonderful, whether contemplated from their effect on the human body, on animal life in general, or on inanimate matter.

Therefore, when considering the special benefits or the special diseases and conditions to be benefited, there are other agencies or influences which may be taken into account, such as, for instance, those relative to the sea, namely, the forcible activity or movement of the water, the physical conditions of the strand, the distance and convenience of the dressing rooms, etc., and those relating to the individual, namely, the resisting power of the body, the time of the bath, length of time of exposure, the temperament, the physical debility present—i. e., whether the body is relaxed, enervated, nervous, or highly tensioned; and also whether the result to be obtained should be bracing, tonic, stimulating and invigorating.

Our type necessarily will be a youth representing vigor and perfect development. In the immersion of such an individual in sea water at a temperature of from 65° to 70°, we would naturally find a quick response to the sudden stimulation of cold, that is, of the water, which meets the surface of the body as the plunge is taken. The stimulus to the peripheral sensory nervous system is such that it quickly contracts the adjacent capillaries and sends the blood speeding to the larger vessels and internal organs. The systemic vigor and reserve forces return it again to the surface of the body, accompanied by the resiliency and invigoration which emphasize the pleasurable sensations so gratifying to the bather.

If after dressing from such a bath, a genial glow suffuses itself over the sensitive surface of the body and is succeeded by a pleasing warmth internally, accompanied by a refreshed and invigorated feeling, it is evidence and proof of the salutary influences; but if instead there follow a chilliness, languor, headache, irresistible depression and disposition to drowsiness, or any of these, it should be reckoned as important evidence that the bath has not contributed in any material way to the

advantage or improvement of the person's health, and that, if persisted in under similar or like conditions, the result will in time prove injurious.

With these generalities and references, I now come to speak more specifically of the use of the bath and the special conditions and diseases for which it may be used. In the first place, I venture to make the statement that the sea or ocean bathing as practiced at Atlantic seacoast resorts is responsible for greater harm than good. It may be said in advocacy of such a practice that the majority of bathers bathe for pleasure, with a blind disregard for either its advantages or disadvantages, and indulge themselves for such periods of time as either their own or their friends' convenience permit.

Many of us have stood on the strand and observed not a few but many young, middle-aged and old alike returning from the surf, or from a prolonged exposure in their wet clothing on the sand, to their dressing rooms, slightly and even markedly cyanosed, with pale and shriveled cutaneous surfaces, capillaries contracted, cutaneous functions temporarily paralyzed, internal organs and deeper vascular system greatly engorged, and in some instances seriously disturbed, shivering and chattering as they pass, giving little thought to the threatening dangers incidental to the impaired forces and debility occasioned by the exposure.

The practice of promenading on the beach in the scant and poorly protecting garments so fashionable of recent years—I pause to emphasize the word "fashionable"—after an immersion from, say, three-quarters to an hour in the surf, is unmistakably harmful and equally inexcusable, and should have the denunciation of every physician as well as others engaged in the upbuilding and maintenance of good health.

An important feature in sea bathing which must not be lost sight of is the active motion of the water—i. e., the impact of the swells or waves; to this may be added the thermic stimulation of the cold, the chemical irritation of the salt, and the mechanical influence of the forced activity, thus giving a marked nervous stimulation and an energetic primary vascular contraction and subsequent reaction. The cold sea bath combines the stimulating influences of the brine bath at a low temperature with the effect of a stimulating hydrotherapeutic procedure. They are admirable for rapid reaction and prompt functional stimulation, and are indicated in those weakened conditions where normal metabolism is inhibited, or where perverted nutrition exists. Such conditions are present usually in all functional disturbances of long standing, types of which are neurotic dyspepsias, the functional anemias and neuralgias, neurasthenia, and some cutaneous diseases, as eczema in the subacute and chronic forms, pityriasis, urticaria, etc.

Sea bathing is contraindicated in those cases in which the arterial elasticity for any reason has been changed or lost, as in arteriosclerosis, and capillary fibroses; also where the peripheral vessels have ceased to respond to reflex stimuli, or in any case or condition in which the stimulation of the bath would be likely to favor or to produce internal hemorrhage.

THERMOTHERAPY.

EDITED BY DAVID E. HOAG, M. D.

Heat in the Treatment of the Diseases of Childhood.

In the January number of this journal, the editor of the department of Thermotherapy sought to point out the relatively infrequent mention in the literature of the use of dry hot air medication in the treatment of diseases of infancy and childhood.

It was not until later that the masterly article by Kilmer (Medical Record, January 27, 1906), of the Polyclinic Hospital, came to notice. It is therefore with great satisfaction that we present to our readers the greater portion of this paper in its original form. Coming from a man with such a broad experience in the treatment of children's diseases, it is of much value.

The paper opens with a brief mention of the early use of heat as a remedial agent, bringing to mind some of the crude, but still beneficial, methods used in early days. He then refers to the various kinds of so-called "croup-kettles," that have been devised from time to time for the application of warm, moist air in the shape of steam, in respiratory diseases. Mention is also made of the separate rooms in many hospitals, called "inhalation rooms," where plain or medicated steam can be placed from time to time in a warm atmosphere.

The paper is made additionally useful by the appearance of many very complete illustrations showing some of the methods that have been improvised for bedside work, most of them being the original ideas of the author of the paper. Brief review is now made of the diseases in which this method is useful, the technique being also carefully explained.

The chief respiratory diseases which are made mention of in the article are croup, bronchitis, tonsilitis and pneumonia.

In croup, a great deal of dependence is placed upon the relief this form of medication gives to the cough and stridulous inspiration.

In bronchitis, especially the capillary variety, nothing can take the place of either dry or medicated steam to ameliorate the symptoms. Many children receive no other form of treatment but this, with a happy termination to an otherwise fatal

issue. A child with bronchitis should have the inhalation for about half an hour out of every two hours. If the child is sleepy, the croup kettle may be used; simply cover the crib with a sheet and introduce the spout of the kettle underneath the sheet. In older children, better results may be obtained with the child upon the mother's knee, the child being often less frightened when steamed in this position.

In pneumonia, steam may be applied in a similar manner. This treatment, with the application of mustard to the chest and an occasional dose of castor oil, proper feeding and hygiene, often constitute all the treatment necessary.

Diphtheria, laryngitis and whooping-cough are also mentioned as being specially responsive to this form of treatment. Nephritis and rheumatism are the two diseases which are principally mentioned that are among the constitutional diseases which also seem to respond well to treatment. In these cases, however, it is the dry hot air that is used instead of the steam.

Local septic infections and pneumonia, especially when accompanied by the pain of pleurisy, respond rapidly to dry hot air medication. After the application of the dry hot air bath, the skin should be rubbed dry and the head kept cool by cold, wet compresses.

The author of the paper has especially advised an attachment to the ordinary croup kettle which serves the purpose of administering a heat bath in the form of dry hot air and in the form of plain or medicated steam. The principal advantages to be derived from this simple form of apparatus are that it is impossible to upset it; it uses gas and can be kept going for weeks, if necessary, with no attention save the occasional addition of water. It may be carried from place to place with no fear of setting fire to the house, scalding the patient, or burning the hands.

Below is given a concise description of this apparatus from the original text:

It consists of a tin funnel chimney, a fire pot containing a Bunsen burner for gas and an alcohol lamp; a water boiler with a cover; a jointed tin tube in two sections with a gauze chamber, and an asbestos tube. There should therefore be ten parts to the complete apparatus.

To Use the Croup Kettle.—If using gas, place the Bunsen burner in position on the bottom of the fire pot with the round, flat base of the burner slipped under the two tin strips on bottom of fire pot. Have the long end of Bunsen burner protruding through the round hole in rim of fire pot near bottom. Attach one end of any ordinary gas tubing to a gas burner which is near the place where the croup kettle is to be used. Attach the other end of the gas tubing to the long end of the Bunsen burner.

Fill the boiler half full of water and set it firmly on the top of the fire pot. Turn on gas at the key, and when the air is expelled from the gas tubing apply a match to the Bunsen burner. Regulate flame at the burner by sliding the air shut-off one way or the other until the flame is blue and does not sputter or blow. If plain steam only is required, put on the cover to the boiler and connect the tin spout. If medicated steam is required, place a piece of surgeon's gauze or an old handkerchief wet with the required medicine in the small gauze chamber; the steam will now pass through this medicated gauze and become impregnated. If there is any drip from the steam spout, it is caught by the lip of the gauze chamber and re-enters the kettle. The small tin gutter around the top of the boiler also prevents drip falling on the floor. The bottom being weighted prevents an accidental upset. By means of the two handles the kettle can be moved without fear of spilling or burning the hands. When more water is required, pour it through the small funnel in the boiler cover. If gas is not obtainable, substitute the alcohol lamp for the Bunsen gas burner.

The crib is draped with a sheet making a tent over the child, and the spout of the croup kettle is inserted under the edge of the sheet.

To use the apparatus for the application of hot dry air, insert the Bunsen gas burner (or alcohol lamp), as described above. Place the tin funnel chimney over the fire pot, and see that it fits tightly. Place the asbestos tube over the end of the funnel chimney.

Turn down the gas at the key until the yellow flame is only about an inch high. (In the case of an alcohol lamp, use the small aperture in the lamp cover.) The hot dry air may be applied to the entire body, or to any part of the body, by covering the part to be treated with a heavy towel or sheet, always allowing some air space between skin and towel. This may be accomplished by two circles of stiff wire a few inches larger in diameter than the part which is to be treated, and placing these circles over the part; cover them with towel or sheet. Insert the end of the asbestos tube under this towel or sheet. Any degree of temperature may be obtained in this manner.

STATIC ELECTRICITY.

EDITED BY J. H. BURCH, M. D.

The Management of the Static Machine during Humidity. By Millicent K. Holland, M. D. of Trenton, N. J.

During the damp and humid days of July and August, Dr. Holland suggests the following method of drying the static machine. First, Dr. Holland advises the use of a catskin. This is

employed by opening the end of the machine and causing the plates to revolve. The catskin is then held against the revolving circles. Should this not prove satisfactory, four quart fruit jars are to be filled two-thirds full with cracked ice. The remaining third of each jar is to be filled with rock salt. The covers of the jars are to be tightly screwed on, after which two jars are to be placed in each end of the machine. The end of the machine should be quickly closed. When a white frost collects on the outside of the jars, it should be removed by carefully wiping the jars and quickly replacing them. The machine should charge in half an hour. Should it not do so, however, the operator is not to be discouraged. Dr. Holland affirms that he has continued the process of freezing some machines for a period of twenty-four hours.

FOREIGN NEWS AND ABSTRACTS.

EDITED BY AMÉDÉE GRANGER, M. D.

Coming Meetings.

XV. International Congress of Medicine.—The arrangements for the meeting of the XV. International Congress of Medicine at Lisbon, from April 19 to 26, 1906, are nearing completion. The organization, which includes bureau of information, press, navigation, etc., is very thorough. The sessions of the various sections will take place in the building and the annex of the School of Medicine.

Of great interest to all physicians making use of physical therapeutics, is the fact that for the first time in the history of international medical congresses, the Lisbon will have a subsection on medical electricity. The sessions of the subsection will take place in the annex to the School of Medicine.

It is to be hoped that both in point of attendance, and character of the papers and discussions, the section on medical electricity will not be behind the other sections of the Congress.

Dr. Charles Wood Fassett, of St. Joseph, Mo., has organized a party which is to sail from New York April 7th, on the steamer *Konig-Albert du Norddeutscher Lloyd*; stop at Gibraltar, Algeciras, Sevilla, etc., remain at Lisbon, during the week of the congress and return to New York May 9th. The cost for the trip, all traveling and hotel expenses paid, is \$300 per person. Special tickets can be obtained to visit the principal cities of Europe. Those who are interested should communicate at once with Dr. Fassett or the steamship company office.

French Association for the Advancement of Science.—The next meeting of the French Association for the Advancement

of Science will take place at Lyons during the early days of August, 1906.

Prof. Orloing, Dean of the Lyons School of Veterinary Surgery, is president, and Mr. Chantry, Director of the Museum of Natural History, is Secretary of the local committee of arrangements.

Among the sections which will prove of interest to our readers, we note especially that of Medical Electricity (Section 13), which will be presided over by Prof. Imbert, of Montpellier.

The sessions of the Congress will probably all take place in the building of the Faculty of Medicine.

The committee is already preparing elaborate plans for strong attractions in the form of excursions and entertainments.

As in former years, during the Congress, there will be a large exhibit of apparatus in the section on Medical Electricity, which promises to be highly interesting.

We hope very soon to be able to publish in this department the titles of the papers—and names of their authors—to be read before the section on Medical Electricity.

The Next International Congress of Physiotherapy.—The Executive Committee on the International Congress of Physiotherapy met at Bruxelles, December 25, 1905, for the purpose of selecting a meeting place for the Second International Congress of Physiotherapy. The names of several cities were proposed, among others London, Vienna, Bruxelles and Amsterdam. The latter was chosen.

The creation of a Permanent International Committee of the Congress of Physiotherapy and the creation of national committees, to be organized by each country, were also decided upon at that meeting.

The following were elected honorary members of the international committee of the Congress:

Prof. V. Winiwarer, Liege; Dr. V. Desguins, Anvers; Prof. Gilbert, Paris; Prof. Gariel, Paris; Prof. G. H. R. V. Leyden, Berlin; Prof. Baccelli, Rome; Dr. V. Dam. V. Isselt, Utrecht; Dr. Zander, Stockholm; Prof. Landouzy, Paris.

The following were elected members of the International Committee to represent the United States:

Dr. Francis B. Bishop, Washington, and Dr. William Benham Snow, New York.

Medical Use of the X-rays by Others than Physicians.—During the end of the year 1905, the French Academy of Medicine appointed a committee to investigate the legal conditions of the medical employment of the Roentgen Ray. January 9, 1906, this Committee made an exhaustive report to the Society, and proposed the adoption of the following resolution:

"Considering:

"That the medical use of the X-rays can determine some grave accidents; that certain practices can create a social danger:

"That alone doctors of medicine, sanitary officers and graduate dentists (in so far as the practice of odontology is concerned), are capable of interpreting the results obtained with the X-rays and the diagnosis and treatment of the same; the Academy resolves that:

"The medical application of the Roentgen rays by persons not provided with the diplomas mentioned above, constitute an act of illegal practice of medicine."

After a lengthy discussion the resolution was unanimously adopted by the Academy.

The Action of Currents of High Frequency and of High Potential Upon Pulmonary Tuberculosis in Its Various Stages.

—Dr. H. Thiellé treated 26 tubercular patients with currents of high frequency and of high potential. Thirteen are cured, 9 of these were hard working laborers; 4 patients which are on the road to recovery, are still under treatment; 7 incurables were treated for the sake of completing his study and observations.

The author concludes as follows:

"The high frequency effluve fills the therapeutic indication demanded by clinical experience; it has an evident action upon the chemistry of respiration: increases the respiratory capacity; diminishes the frequency of respiration, the production of carbon dioxide, the total amount of oxygen consumed and absorbed by the patient; as a result, raises the coefficient of oxidation and lowers the coefficient of absorption.

"This action is not temporary; it continues even after the cessation of the treatment. When during a course of treatment, we notice from month to month increased respiratory exchanges and a diminished respiratory capacity, we will always find the cause in the existence of one of the following complications: Coryza, catarrh (usually severe), influenza, syphilis, physical or intellectual overwork, prolonged walking, mental depression, etc.

"In two cases with fibrous change (Cases 7 and 8) the respiratory exchanges remain slightly above normal, and the treatment prolonged several months, even during one year, did not produce any change.

"The high frequency effluve increases the acidity of the urine, raises or lowers, depending upon the case, the products of nitrogenous combustion in the body, and arrests the excessive loss of mineral salts, which is a constant symptom of a tuberculous state.

"The modality produces the following changes in the composition of the blood: The amount of hemoglobin and the num-

ber of red blood cells are increased, and there is usually a decrease of white cells. The tissues being remineralized, the leucocytes obtain the mineral elements of which they are deprived in the tuberculous subject, and, therefore, regain their activity and power; the defenders of the organism remain in fewer numbers but stronger, quality replacing quantity. The number of lymphocytes, those young cells which perform an important part in the nutrition, repair and cicatrization of the tissues, is increased.

"The general health of the tuberculous in all the stages of the disease improves under the influence of the effleuve; respiration is easier, inspiration deeper. All our patients experience a cool sensation, due to the penetration of air in the lungs, especially the one which is the most involved. This cool sensation disappears about the time of the fifteenth application.

"The oppression and the dyspnea disappear after 15 or 20 séances, sometimes earlier, rarely later.

"The cough is modified from the start; it diminishes progressively and disappears in some of the cases during the first month, in others, during the second or third month; but the coughing spells rarely occur, except at night and in the morning, sometimes after meals, and they do not last as long and are not as painful.

"The effleuve occasionally provokes a dry cough, even a slight dyspnea; The cough and dyspnea are caused by the direct application of the ozone which is liberated by the apparatus, but there is a gradual tolerance. The expectoration is easier, less frequent, less abundant, from purulent it becomes mucous and ceases, as a rule, before the end of the treatment.

"The bacilli disappear sometimes during the early months, sometimes at the end of the treatment; we have never seen it reappear in any of our cases which were cured. Excepting temporarily in case 2, after a severe attack of *grippe*, accompanied with high fever.

"We attach no importance to the quantity of bacilli found on the microscopic field, this quantity being very variable: it is admitted that the expectoration on rising contains a larger number; after this morning expectoration, which cleanses the bronchi, the following sputa contain less bacilli and often none at all. The appearance of the bacilli in the sputum is a late symptom. Tuberculosis begins the moment that the bacilli penetrate a favorable soil; this invasion is slow, insidious, and formerly escaped all our investigations; the study of the chemistry of respiration permits us to detect tuberculosis from its inception, and even to recognize the predisposing soil; when the enemy is known, it is easy to fight him and to render, by an appropriate treatment, the systems of those who are predisposed immune against the disease.

"The sleep is better from the first night; the sweats diminish and cease when about 15 applications have been made.

"The appetite returns after the first few séances, increases after the tenth or so, and gets better and better. The digestion is good.

"The strength returns and increases progressively during the course of the treatment, nearly all our patients were able to continue their daily labors, a point of the utmost importance to them, since they depended upon their labors for a living and often for the support of large families.

"The weight varies according to the patient: increasing very little in some; a great deal in others. Again it was subject to variations, depending upon the diet, fatigue, etc., variations which are also observed in healthy individuals. All our cured cases have maintained a weight which is greater than that before the treatment.

"When the patients were weighed, they had taken no food in several hours and wore the simplest and lightest garments.

"In phthical cases, with fever, as well as those with softening or cavities, the effluve always increases, but temporarily, the respiratory capacity and diminishes the frequency of the respiration. The lowering of the respiratory rate occurs from the first month, but later remains stationary, differing thus from the marked gradual decrease observed in the tubercular patients, which are curable; although the treatment was extended over six months and in some instances over one year, we have not been able to restore to the normal rate the respirations, which after a lapse of time more or less prolonged, or after cessation of the treatment, begin again to rise.

"The general health in the patients belonging to these various categories is good or seems good; the appetite returns, the weight increases, the strength is regained, work and exercise are easier, the night sweats disappear, the nights are good. The oppression ceases momentarily, the cough is less frequent and painful, the physical characteristics of the expectorations are modified. It is less purulent, less abundant, easier, and becomes at times almost negligible. The mental condition is better; the patients are hopeful for a cure; the effluve has caused an illusionary cure, but not a real one, and after a varying lapse of time, the disease resumes its destructive course.

"The organism is vanquished, the bacillus of Koch continues its work of destruction, and the fatal termination is only a question of time.

"Without the biological examinations, these temporary improvements and apparent restorations to health, may have given us the illusion of success.

"If we have not been able to have, even for one instant, the illusion of curing these patients, we have at least given them

that illusion, and we have also, thanks to our modality, afforded them an immense relief, since in nearly all the oppression, cough, expectoration, sweats and weakness only reappeared much later, during the last stages of the disease. (*Bulletin Officiel de la Société Française d'Electro-Thérapie*, November, 1905.)

SOCIETY MEETINGS.

THE FIFTEENTH ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

THIRD DAY, THURSDAY, SEPTEMBER 25, 1905.

(Concluded from p. 106.)

AFTERNOON EXECUTIVE SESSION.

Dr. Brinkmann: I move a vote of thanks to the Academy of Medicine for their courtesy in giving us the use of this hall for the purposes of the present convention, accompanied by the usual honorarium. Seconded and carried unanimously.

Dr. Brinkmann: I also move that a similar vote of thanks be passed—without honorarium—to the Interborough Management, and that the Secretary be instructed to forward the Company a copy of this resolution. (Seconded and carried unanimously.)

President: It is customary at the termination of the Executive Meeting to devote a few minutes in silence to the memory of the members who have departed this life during the year. They are Drs. James Thompson, Willis P. Spring and Truman A. Pease.

Members respond to the call of the president standing.

Dr. Eaton: In acknowledgment of the fact that the Entertainment Committee provided for us in every way, looking after our care and comfort, I move that a hearty vote of thanks be given to them by the members of the Association. (Seconded and carried unanimously.)

At the request of Dr. Dickson, the vice president, Dr. Brinkmann, at this juncture took the chair.

Dr. Dickson then said: It is proper that a cordial vote of thanks be offered to the retiring officers of this Association for the able manner in which they have carried out their respective tasks. The programme of the present meeting represents the work done, and shows the variety of topics embodied in the execution of such work, but it can hardly give us an adequate idea of the enormous amount of work it has entailed upon them. Work of this kind does not do itself: it has to be initiated, and we can see that they are master hands that have done it. A vote of thanks is due to our retiring president for the able manner in which he steered the ship through the many

storms and landed us safely in the harbor, where a new captain has been placed at the helm to take charge of the course of affairs, and our new captain will find the ship in excellent condition and seaworthy for a further journey.

Similarly, a vote of thanks equally sincere is due to our retiring secretary for the very able manner in which he has discharged his most arduous duties. It is with a feeling of regret that we lose such a faithful and efficient servant, for he left affairs in such splendid and flourishing condition that the newly coming secretary will have much less to perform than the outgoing one had. To all the other retiring officers our hearty thanks are also due, and I move a rising vote of thanks.

Dr. Brinkmann: Gentlemen, you have heard the resolution which no doubt is in every way deserved. Only those who know the work that is entailed upon the officials of an Association like ours can appreciate or realize what the retiring officers have done for us. You can not have a more efficient president or secretary, displaying greater diligence and care, than the two gentlemen who have filled these offices during the preceding year. The fullest attention was given to the minutest detail, not a thing was overlooked, and in every one of the executive sessions of the Council that same care and attention was employed. I personally think we had a very successful meeting, and the retiring secretary and president deserve credit for that success. I have much pleasure in seconding the resolution.

Dr. Eaton: The Chairman has forgotten one name, and that is the name of the gentleman who now occupies the Chair.

Chairman: That is very kind of you. The man who executes is not the man who plans. The soldier does the fighting, but the General leads the army.

The resolution was carried by acclamation.

Dr. Heuel having resumed the Chair: Gentlemen, I want to thank you for the honor you have done me. It is a pleasure to think that you have been pleased with the administration under my presidency. As regards our retiring secretary, I could only reiterate the words of Dr. Dickson and confirm that he has been a hard and efficient worker in our cause. So far as the local Committee of Arrangements is concerned, I know that Dr. Brinkmann has been working day and night, ably assisted by Dr. Snow. He is one of our best and most enthusiastic workers. Will Dr. Titus kindly usher Dr. Snow to the rostrum so that I may hand over to him the emblem of office.

Dr. Snow: I would like first to move a vote of thanks to Mr. Braun, the Librarian of the Academy of Medicine, for the courteous manner in which he has assisted us in carrying on our arrangements. (Seconded and carried.)

Dr. Titus conducted the new president to the chair.

Dr. Heuel (turning to Dr. Snow): Dr. Snow, in handing

over to you this gavel, I hope you will take care of it as I have, and that it will help you to elevate the cause of the Electro-Therapeutic Association. I know you will do your best. Dr. Geyser, our new Secretary, I need not introduce. I know he will do as good work as his predecessor has done, and he will try to do a little better, although we can hardly hope to see the services of Dr. Skinner excelled. He will not write as many letters, but I hope he will do just as well.

Dr. Snow: Mr. President and Fellow Members: I am deeply sensible of the honor which you have conferred upon me. In the exercise of my duties as President I will do all in my power not only to further the interests of this Association, but also the cause of electro-therapeutics. The time has come when we as individuals are the marks of the critics, who look upon our work with distrust. We ourselves realize its great importance from our experience and from the knowledge which we have derived from the treatment of the afflicted. The time is not far distant, when the great medical profession will, as a unit, recognize the work we have accomplished. When that time comes, the advances made by this Association must become the recognized field of the whole profession. I shall do my best during my incumbency of this office, as I ever have, and shall, to hasten the day of universal recognition. Gentlemen, I thank you for the honor bestowed upon me.

Dr. Geyser then said: In the first place I wish to thank you most heartily for the confidence you have shown me in electing me to be your secretary. Unfortunately I come in the tracks of a man perhaps second to none, and the burden of the office will rest rather heavily upon me simply on that one account. However, anything which is undertaken with a will and a desire must be sweet to any man. I wish to have it understood that I regret that there are not more members willing to act in that capacity, and also that during the interim from this meeting to the next meeting I should like to have every member consider my office the home of this Association. I wish every one to come close to me as any member in their own home, and that any information they desire or wish to impart will be as gladly received as I will give it.

There have occurred during this meeting and especially during the Executive Sessions some things which might have been unpleasant, but evil may be the root and foundation for good, and it will be my principle and my endeavor to carry it out. As Secretary, I will respect the office of the President, and I hope that at the end of his term he will have no fault to find with the Secretary of this Association. It will be my endeavor to further in every possible way the interests of each and every member, if they will only call upon me, which is all that I ask of them.

On motion the meeting adjourned sine die.

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TUBERCULOSIS.*

BY J. D. GIBSON, M. D., DENVER, COLO.

It is not the purpose of this paper to go deeply into the consideration of tuberculosis, but to touch lightly on some of the principal features and make a report of about fifty cases which have been dismissed from treatment with varying degrees of improvement.

I have used in the treatment of these cases what I have styled in a previous paper "The Intensification Method," by which I mean the intensification of nature's agents in the cure of tuberculosis pulmonalis. I will explain more fully my meaning: Nature's great agents, in combating all contagious and infectious conditions, are: sunlight, fresh air, or air rich in oxygen. In very dry climates where there is a moderate degree of cold, we find an electrical condition present of great value in addition to the fresh air and sunshine.

It has been my aim to reinforce or to intensify these natural conditions by means of the X-ray, ozone and static electricity.

All the cases reported in this paper have been treated in the following manner: (1) *Symptomatically*—the nose and larynx have been treated locally, either by myself or a specialist as indicated. (2) The *stomach* and digestion have received attention, so that the greatest amount of nutritious food could be taken and digested. (3) The heart has been observed and kept at the highest degree of efficiency, which is especially important in this altitude. Medical tonics, codliver-oil emul., pepsin, pancreatine, strychnia, digitalis, have all been used more or less constantly to induce and enable the patient to take the greatest amount of nourishment to assist in combating the disease. We have endeavored to get all the possible benefit out of rest. All of these patients, however, were treated at

* Read before the Fifteenth Annual Meeting of the American Electro-Therapeutic Association, New York, Academy of Medicine, September, 1905.

the office and compelled to take more or less exercise in going back and forth. Besides, many were induced to go to the parks, that they might be more in the fresh air, and therefore in some cases as much rest was not possible as was desired. Rest, in nearly all cases, is one of the most important aids in the management of this dread malady, especially where there is fever. They have all been encouraged to be in the open air and sunshine as much as possible and cautioned to keep warm—under no circumstances to allow themselves to become cold, but to try to keep comfortable in their airing.

"*Fresh air*" is undoubtedly the most over-rated agent at the present time, in that many physicians and almost all the laity consider it, or at least make it appear to be, the only essential agent in the treatment of this disease. It is in this *accentuation* where the harm comes in, which causes more of the seven hundred deaths from tuberculosis that we have in this city per annum than anything else. They expect too much from the "fresh air" alone, and waste their opportunities until it is too late.

The writer's method of treating tuberculosis is, to judiciously employ medicines, climate, rest, diet, sunshine and fresh air and to supplement them by the additional use of the three agents noted above—the X-ray, ozone inhalations and static electricity.

It has been my endeavor in using the X-ray for the benefit of the lungs to hasten fibrosis, to produce a condition of the fluids inimicable to the propagation of germ life and finally to produce a hyperemia or engorgement of the lung cells or tissues and a probable hypertrophy, as it were, which will enable the phagocytes to fight a winning battle with the bacilli. In this battle I consider the artificial fluorescence, as suggested by Dr. William J. Morton, of great benefit in the treatment of pulmonary tuberculosis. In regard to the technique, the coil of large size with a large output—having at least five or six amperes flowing through the primary, employing a tube not too high—one furnishing a ray that will give a good skiagraph of the chest in about one minute. The tube should be placed at the distance at which it will produce the best effects upon the lung tissue with the least effect upon the skin and superficial tissues—it is the lungs we wish to treat, and not the superficial tissues. Care must be taken that nothing more than an engorgement is produced in the lung tissue, which I find is usu-

ally denoted by increased shortness of breath, which is the symptom I look for in all cases. Its influence in controlling the temperature is very positive. This agent has come to be my most trusted ally in the treatment of tuberculosis. In fact, I am beginning to believe that it is worth more in the treatment of this condition than all other physical agents combined.

In the ozone, or as I use it, an ozonized nebula, the nebula consists of camphor, menthol, beachwood creosote, oil of eucalyptus and oil of pine needles in alboline, which is vaporized and forced through the ozone generator, from which it is inhaled by the patient.

Ozone (O_3) is supposed to be absorbed or to mix with the oil nebula in the proportion of one to two without any chemical change, giving me for inhalation an ozonized nebula which, I believe, is more efficacious than either by itself; I find this measure very useful in chronic coughs.

Electricity, in any form in which it is adapted to the condition in hand, is such a well-known and powerful tonic that it needs no farther exploitation, but, to emphasize, will add that I consider it when properly used to be the very acme of all tonics, aiding digestion, toning up the nervous system, while in its final effects upon end organ metabolism it has no competitor. In the following cases there were but three or possibly four that could be said to be in the first stage. Most of the cases were well advanced in the second and some in the third stage of the disease. Nearly all had cavities and many had extensive regions of consolidation, as is shown in the skiagraphs.

Case 1.—Mrs. J. F. J., February 9, 1904, had slight involvement of the right apex, and is lighter than when she came to Colorado. Her lungs are now apparently normal and have been for one year.

Case 2.—Mr. B., tuberculosis of the larynx, infiltration extreme, lungs also in bad condition. The patient was referred to me by Dr. Lockhart. Owing to poverty this patient had to go to the charity hospital, and treatment was abandoned.

Case 3.—February 29, 1904, Mrs. F., larynx and lungs both involved; very bad; was treated every other day for three weeks, when, owing to exertion required to get to the office, treatment was abandoned. She improved slightly, and the laryngologist who referred her to me states that he saw her a

few weeks ago, and the disease was in a stationary condition and that she was doing very well.

Case 4.—B. B. T., April 5, 1904, tuberculosis of the right apex quiescent, glands of the neck (which had been surgically removed at two different times) actively and painfully involved, and his condition such that he could not rest for the pain in his bowels and lower abdomen, where enlarged glands could be made out under the finger tips on firm pressure. He was also rapidly losing strength. The X-ray promptly relieved the symptoms. The enlarged glands have disappeared from the neck and abdomen. He was dismissed from observation in July, married in September of the same year, and is now (one and one-half years after treatment) apparently well.

Case 5.—April 11, 1904, A. W., very far advanced case, had lost weight ever since coming to Denver, and had already given up, intending to return to New York. After one month's treatment he had gained four pounds, but, becoming homesick, decided to return to New York and try Liberty.

Case 6.—May 25, 1904, Mrs. G. C. G. The whole of the left lung was consolidated. The first morning she came to the office her temperature was 99 1-5; weight, 123½ pounds; respiration, 35; pulse, 135. On June 19, 1904, the pulse was 104; respiration, 28; weight, 125 pounds; temperature, 98 2-5. This patient having a child it was very difficult to find a boarding place suitable for her. One was finally procured on the outskirts of the city, but as the journey to office for treatment fatigued her so, the office treatment was discontinued, and tonics, rest, diet and climate only relied upon. She sank rapidly from the effects of mixed infection and died in September. She improved so long as she was able to take special treatment at the office, but failed rapidly as soon as it could not be continued.

Case 7.—J. E. M., June 17, 1904. An old case—tuberculosis in chronic state and much run down. Under treatment she gained 15 pounds and has remained to the present time in a very satisfactory condition.

Case 8.—N. G. W., July 30, 1904. Young man, 28 years of age; weight, 119 pounds; evening temperature, 101; extensive involvement of both lungs, a skiagram showed. He was put to bed for one month and then treated for two months with the X-ray, at which time he weighed 150 pounds. In January he

had a very serious relapse, due to exposure in zero weather. He had several hemorrhages, with return of fever. He was again given two months' treatment, which yielded some results. He returned to Mississippi, his native State, earlier than I desired. He writes me, however, that he has resumed his law practice, is gaining in weight and improving in all particulars.

Case 9.—W. C., July 5, 1904. Patient had very slight involvement located in the lower lobe of the right lung. The condition seemed to clear up, but as far as the general condition there was little change. His general condition, however, was good in the first place, he having lost very little weight. He considered himself well the last time I heard from him.

Case 10.—Miss E. T., July 15, 1904. This patient was considerably run down and had a tubercular involvement of the base of the left lung. One month of X-ray treatment was given when the patient had gained 12 pounds. After three months more the patient weighed more than ever before—returned home to the East and has since remained well.

Case 11.—Mr. G. J. M., had slight involvement of the right apex. This patient improved uninterruptedly to recovery.

Case 12.—W. P. D., August 17, 1904. His case was desperate, extensively involving both lungs as well as the larynx and pharynx. There was a fearful ulcer (remains of thermocautery) the size of a silver dollar upon the upper side of the pharyngeal vault. He was treated for two weeks, during which time he gained four pounds. His relatives in the East, however, ordered him to go to Arizona.

Case 13.—Mr. M., October 1, 1904. A very desperate case—had been in Colorado for several years and had gradually gone from bad to worse. The larynx and ears were also badly involved. The improvement was slight—through two months treatment the patient gaining only about four pounds. He has steadily gained, I understand, ever since, except his ears, which were not exposed to the ray.

Case 14.—Miss E. H., December, 1904. Patient had moderate involvement of the right apex. She has had many hemorrhages. One month's treatment, her condition substantially improved. She is now in Texas and doing very well.

Case 15.—E. J. B., April 4, 1905. Very bad naso-pharyngeal condition, with serious involvement of the apex of the right

lung. He gained from 12 to 15 pounds; his normal weight much improved.

Case 16.—J. M., March 23, 1905. Considerable involvement of the left lung. Old involvement at apex, but the active process was confined to base of left lung; while under treat-



Fig. 1.—Case 18 during treatment.

ment he had several hemorrhages. He returned to his home in Alabama in September, and a letter just received states that he is weighing 165 pounds and never felt or appeared to be better. He is weighing 17 pounds more than he ever weighed before treatment.

Case 17.—Miss H. J., May 7, 1903. Had involvement of the left apex and thickening of the pleura at the base of the same lung. There was a great deal of precordial pain, pulse fast and irregular, abdomen swollen, and there was also edema of the feet and ankles. Treatment was given for three months, when she had apparently recovered, and is now enjoying the best of health and weighing more than for years.

Case 18.—E. S., May 1, 1905. Marked consolidation in both lungs with many rales. The case was a very grave one. He

had been in Denver about one year and lost about thirty pounds since coming. He gained nineteen pounds the first month and, at the present time, is weighing more than ever before and looks the picture of health. (See Figs. 1 and 2.)

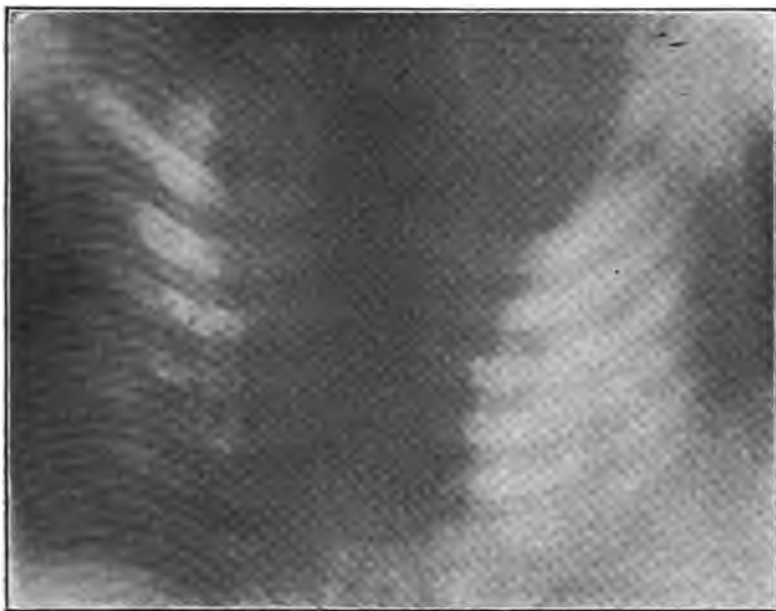


Fig. 2.—Case 18 after treatment.

Case 19.—J. Y. There was considerable involvement of both apices, some fever and rapid pulse. Under treatment he gained in weight very rapidly, and was dismissed from treatment and allowed to return to Georgia in September. He is still doing well, and delighted with his condition.

Case 20.—R. E. N. A desperate case. Skiagraph shows miner's infection. (See Fig. 3.) He was compelled to be carried to the office at the beginning of treatment, but improved so that afterwards he could walk for blocks. It was impossible, however, to expect much improvement, as may be judged by the accompanying skiagraph (Fig. 3), though the improvement was marked, and he is now doing well.

Case 21.—J. O. Was treated three weeks, gaining 6½ pounds the first week and has steadily improved since. The involvement was slight.

Case 22.—S. B. Desperate case. The skiagraph (Fig. 4) shows mineral and dust in lungs in great quantity. He improved during treatment, but has been lost sight of.

Case 23.—A. L. B. Involvement extreme. He had slight fever in the afternoon, with very weak and irregular pulse.

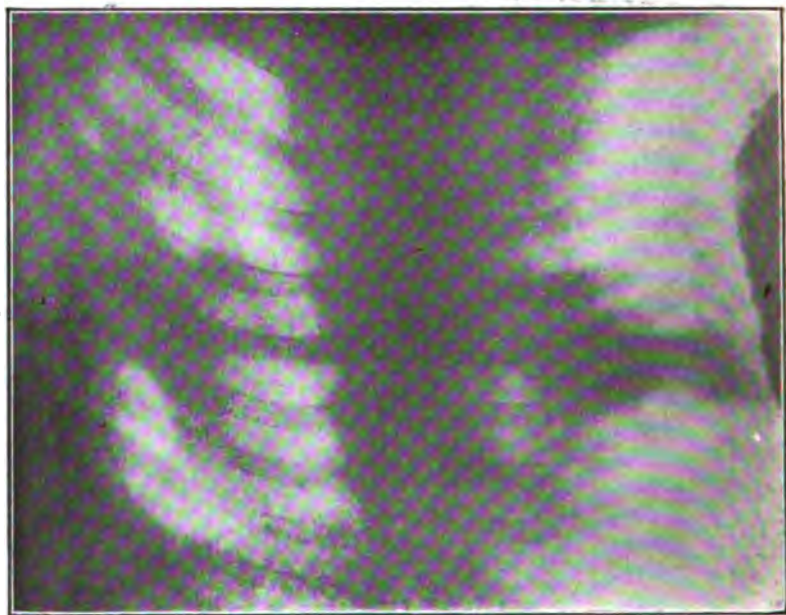


Fig. 3.—Case 20 after treatment.

There was effusion in the left pleural cavity, as shown by the skiagraph (Fig. 5.) Under treatment the effusion disappeared, the pulse improved, the temperature became normal, and the patient gained 12 pounds. He has now been dismissed from treatment for six months, during which time he has held his own and even gained in weight while doing some work—earning his own living. A remarkable improvement is shown by skiagraphs, taken before and after treatment.

Case 24.—H. B. Was under treatment for six weeks. There was very marked improvement. He returned to St. Louis on account of illness of his parents and had fared so well that it has not been necessary for him to return to Colorado.

Case 25.—J. L. P. Had considerable involvement of the right lung. He gained five pounds in the first month and gave

up treatment and went to work. He returned in two weeks and had lost all he had gained. It was impossible to persuade him to be patient or rest, and was therefore advised to abandon treatment until he could give it his attention.

Case 26.—A. W. Y. There was extensive involvement of the upper lobe and apex of the left lung as well as the right

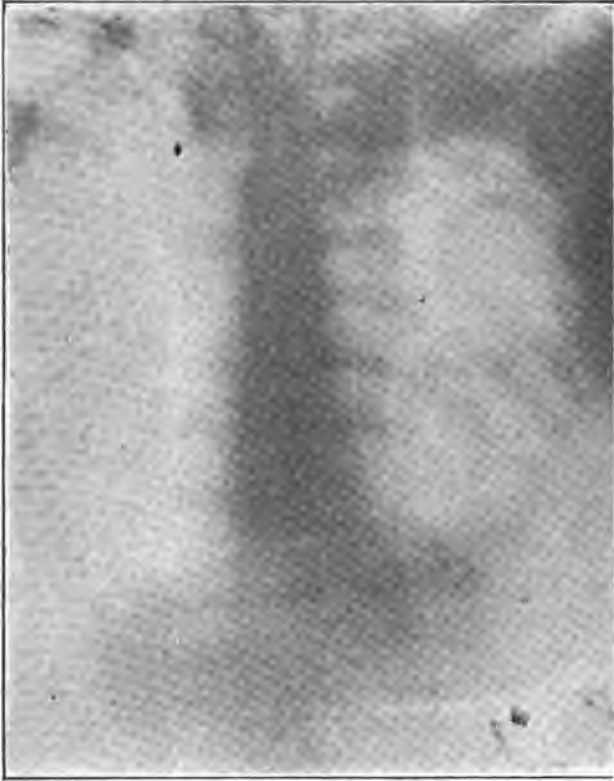


Fig. 4.—Case 22.

apex and a very badly involved larynx. He was advised that a laryngologist should look after the local treatment of his throat. His first series of treatment of two months was rather disappointing. After four or six weeks' rest treatment was resumed, and then the improvement was marked. He now looks and feels splendidly. His larynx is improved and his general condition good.

Case 27.—G. H. Improvement marked.

Case 28.—S. H. Improvement very marked; gained 19 pounds in one month.

Case 29.—Mr. M. Involvement not serious, but heart very badly affected by altitude. He responded to treatment and is now improved, with lungs and heart doing finely six months after dismissal.

Case 30.—Miss W. Was almost a skeleton, weighing but 88 pounds. It was with difficulty she could get to the office. The

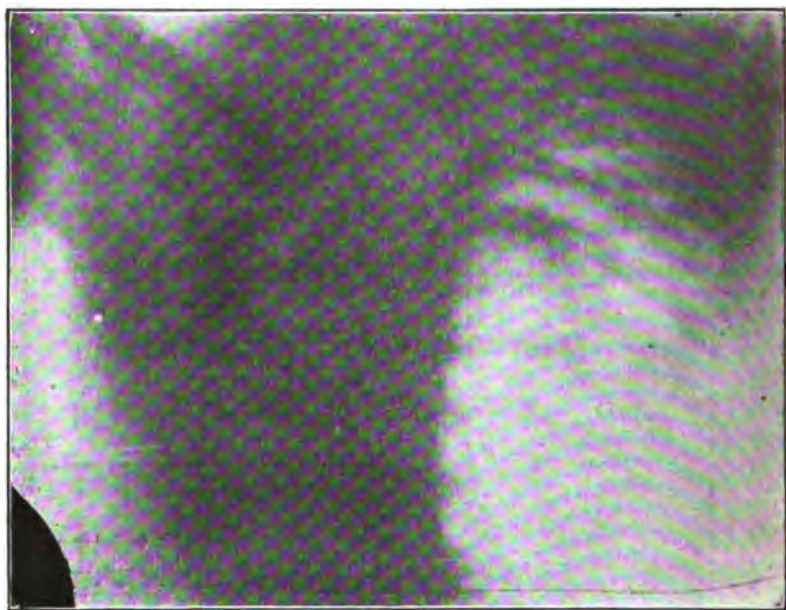


Fig. 5.—Case 23.

whole of the left lung was badly involved and there was one cavity in the left apex, with the larynx also seriously involved. She now weighs 100 pounds, goes here and there as she pleases, and is not taken for an invalid until she speaks. Her throat, as well as her general condition, has made a very satisfactory improvement.

Case 31.—W. L. D. Has the entire left lung involved and the apex of the right. After completing his course of treatment, I advised him to go to Phoenix, Ariz., for the winter. He writes that he is doing finely.

Case 32.—Mrs. A. T. K. This was a very bad case—very acute. The lungs and bowels were involved, and was compelled to cease treatment on account of fatigue from coming to the office.

Case 33.—J. L. M. The whole of the left lung was involved, in which were located two cavities. At two different times he improved for three weeks, and then lost ground for some unaccountable reason. The result was a failure and it was doubtful

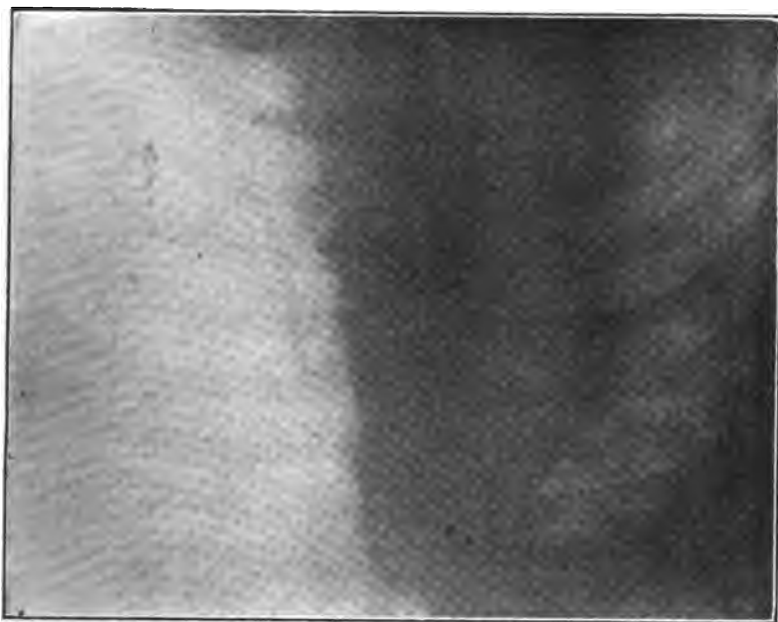


Fig. 6.—Case 26.

whether it was due to an inherent idiosyncrasy of the patient or to a fault of technique used in the treatment. No other patient has reacted in the same way as this one.

Case 34.—J. M. G. A very bad case; both lungs badly involved. Was obliged to discontinue the treatment, as he was not able to stand the trip to the office.

Case 35.—E. A. Was treated for two weeks. There was no improvement, which, I think, was due to continued work and worry.

Case 36.—J. L. E. Treated one month; gained 8 pounds; improved.

Case 37.—Mrs. E. P. Tuberculosis of lungs and bowels; extreme case; treated two weeks; bowels much improved, but had to move to outskirts of city, and it was impossible for her to get to the office and she soon died.

Case 38.—T. B. F. Involvement of right apex slight; treated six or seven weeks. Returned to Alabama and is doing well.

Case 39.—Miss E. P. Involvement of left apex; gained 10 pounds; feeling splendidly. Returned to work and now, after three months, is doing well.

Case 40.—F. O. Right lung almost completely fibrosed and



Fig. 7.—Case 30. Miss W.

solidified. Upper half of left lung very badly involved; one large cavity in right apex, the smaller one near the base of the upper lobe. He gained 12 pounds; was dismissed from treatment; very much improved. Some time afterwards he contracted pneumonia from exposure at a fire close to his house on a cold night and died very suddenly.

Case 41.—Mrs. E. M. Both lungs badly consolidated, the left the worst. Bowels so loose that patient was afraid to risk herself upon the street; she was afraid to eat anything on ac-

count of diarrhea. The X-ray checked the bowels, and now, one month after the last treatment, she has one to two movements from the bowels in twenty-four hours and eats almost anything she desires. She has gained about 15 pounds. I consider her condition much improved.

Case 42.—J. I. Apex of left lung involved and pleura much thickened and painful at the base of same lung. Improved and doing well one month after treatment.

Case 43.—Mr. A. E. Treatment one month; gained in weight and improved.

Case 44.—W. S. L. Treated three weeks Improved

Case 45.—Mrs. L. Treated two weeks; gained 5 pounds; improved.

Case 46.—W. B. H. Left lung badly consolidated; small cavity in outer apex. Greatly improved.

Case 47.—S. B. Very severe involvement.

Case 48.—Mrs. G. Tuberculosis of the bowels relieved.

To these cases can be added eight more who have been dismissed from treatment for from three to five years and are doing well, most of them weighing more than they have ever weighed.

To briefly summarize my conclusions, I would say I think these cases demonstrate the undoubted value of X-ray in pulmonary tuberculosis; I do not wish to minimize the other agents employed, but do wish to accentuate the value of X-ray.

There are in this report twenty-seven cases, Nos. 4, 8, 12, 13, 15, 16, 17, 18, 19, 20, 22, 23, 24, 26, 29, 30, 31, 32, 36, 37, 39, 40, 41, 42, 46, 47, 48, all in such advanced stages with large amounts of lung tissues involved as would preclude all hope of recovery by ordinary methods of treatment, therefore I believe they owe their condition of well-being largely to the X-ray. Climate with the usual medicinal care had been tried in all these cases in periods varying from six months to several years without success.

The majority of the other patients noted in this report that have improved would likely have recovered in this climate with medical care without the X-ray.

THE ASSOCIATION OF THE VARIOUS PHYSICAL AGENTS INTO A RATIONAL THERAPY.

BY PROFESSOR CARLO COLOMBO, M. D., ROME, ITALY.

(Continued from page 172.)

The considerations which are apropos to sciatic neuralgia of uric-acid nature apply to all the other morbid manifestations of the neuro-arthritis diathesis, gout, calculi, skin-diseases, disturbances of the digestive apparatus, chronic catarrh of the various mucous membranes, including the bronchial, neurasthenia, piles, hypertention of the arteries, which is the prime factor in arterial sclerosis, etc.

All these morbid states can find in their turn real and durable cure in a complex treatment in which with the fundamental cure of the uric-acid diathesis become associated the auxiliary treatments directly effective in each one of its special localizations. Thus there is recourse to the local applications of dry heat and of massage by the hand, for the joint affected in gout, to abdominal massage for hepatic and renal calculi, to the high-frequency current in skin diseases, to abdominal massage in disturbances of digestion, to medicated inhalations and to pneumatotherapy in bronchial catarrh and in asthma, to an appropriate hydrotherapy and to spinal galvanization in neurasthenia, to the application locally of currents of high frequency in piles, and in general to auto-conduction in arterial hypertention—treatments all of which the patient ought to find employed in a single institution at the disposal of the physician who prescribes them.

Another course the physician finds facing him in a case of infantile paralysis. Not rarely he confesses his own powerlessness and abandons the little patient, to his own disgrace and to therapeutic nihilism, uttering gloomy prognostications. On the other hand, there are numerous physicians, more enlightened and less skeptical, who are not ignorant that the most recent acute anterior poliomyelitics are in general amenable to physical treatment if taken in time. But many of these, though animated by the best of intentions, have not the possibility nor the desire to send the little patient into an organized institution of physiotherapy, and they think they have subserved all the interest of the patient himself by initiating an

electric treatment or by intrusting the charge to a specialist in electrotherapy. And in this last case the electrotherapeutic treatment will certainly be applied scientifically and regularly with the most perfect apparatus.

Well, we ask here, is an electric treatment sufficient, though it may be applied according to the most scientific of rules? Although the exclusive users of electrotherapy may wish to affirm it, yet we say in brief, no. No electrotherapist has ever been able to see to what point it is possible, so to speak, to regenerate a paralytic unless he has been able and willing to use other means besides electricity.

If we analyze briefly the anatomical and functional permanent alterations which result from acute anterior poliomyelitis we shall see that they are reduced essentially to these four:

(1) Paralysis, with signs of degeneration more or less extended, more or less advanced, of the motor nerves.

(2) Disturbances of the circulation, especially venous stasis in the region of the nerves affected.

(3) Disordered nutrition, atrophy of the bone and of the muscular masses depending on the paralyzed nerves.

(4) Alteration in and around the joints, subsequent to the alteration of elasticity and of tension of the capsule, of the ligaments, and of the tendons, from which results respectively either excessive relaxation or stiffness of the joint.

First, as the case stands we admit, nay, affirm, that electrotherapy under the form of cathodic galvanization, or, better yet, with that variety of sinusoidal current which has taken the name of undulatory or pulsating current, can be exercised upon the nerves, and the muscles which do not yet present the total inversion of the formula of galvanic excitability, with such a regenerative action as to not rarely restore them to their normal function. But experience teaches that electrotherapy does not succeed in any way in influencing the profound circulatory alteration, the trophic disorders which attack the bones and the muscles, and those other mechanical disturbances which burden the articulation. That the electrical stimulation of the muscles not yet paralyzed, does not exhaust before it increases the energy and the nutrition is so evident that it has no need of demonstration.

The physician therefore ought to introduce other therapeutic

factors, and, more precisely, other physical agents which proceed in harmony with electrotherapy, and of first importance is massage with the hand.

Massage produces the twofold object of setting in order again the circulation of the blood and of actuating the nutrition of the muscles in the paralyzed parts, and at the same time causes a mechanical stimulation to muscular contraction.

The action of massage upon the circulation of the blood can be powerfully re-enforced by the local application of thermotherapy, by using, for example, the Dowsing apparatus for radiating heat. Such applications should be practiced immediately before the massage, with a moderate temperature of 70° C. to 85° C. for 10 to 15 minutes.

Passing to the last category of permanent alterations, we find massage still the most effective remedy to tone up the muscles not yet paralyzed but excessively flaccid, by increasing the elasticity and the tension of the capsule, of the ligaments, of the relaxed tendons. Associated with suitable passive movements, other well-defined manipulations of massage will induce, in suitable cases, return of normal mobility in the stiffened and deformed joint, by capsular, ligamentary, and tendonal retractions.

To complete the arsenal for combating infantile paralysis we should add gymnastic treatment. The admirable collection of apparatus of Dr. Zander is the most valuable aid. By it paralytics are subjected to a true re-education of movement through which they can reacquire the faculty of transmitting the psychomotor impulses to the paralyzed muscles, commencing with active movements, well localized, to the nervous processes which have not undergone complete degeneration.

Good common sense should be exercised by the physician to benefit the little patient in seasonable time employing the therapeutic guards above-mentioned, thereby assuring the recovery of the lost motility to the greatest extent possible.

Beyond the consideration of a scientific order of thing which we have unfolded above, the considerations of other methods should not be ignored by the specialist of electrotherapy, who may not be skilled in the use of massage and the other kinesitherapeutic manipulations, and will therefore be compelled to trust his patient outside his office, to the masseur. The feeling on the part of the electrotherapist, which is

often groundless, that the masseur may prejudice the mind of the patient to the greater value of kinesiotherapy, and belittle the benefits of electrotherapy, is or should be unwarranted. And, reciprocally, the sick person can be found in the same critical condition if he is intrusted originally to a specialist exclusively of kinesiotherapy. It follows therefore that a child stricken by infantile paralysis has not the possibility of having the advantage of a rational and efficacious treatment except by good fortune going to an institution equipped with the various physical measures, and where they will be employed with impartiality.

The hydrotherapists were, till a short time ago, the champions of too great exclusiveness. Water, or more exactly, cold water, was for them the remedy for all ills. Starting with the idea that the stimulus of cold represents an energy affecting the nervous system with a powerful means for accelerating material change, and are not always willing to take account of another fact, not less real, viz., that this action is exercised solely when the organism of the patient is capable of opposing to it an equally energetic reaction. This is therefore the cause, and not the stimulus, of cold, which constitutes the curative factor of hydrotherapy. When the reactive power is wanting in a certain class of conditions it should be considered as improper to employ hydrotherapy, because they will not be benefited by it; as examples may be mentioned a great majority of the neuroarthritic conditions.

Neuropathologists are beginning to draw a distinction between neurasthenics from exhaustion, with arterial hypotention and temporary depression of all the organic functions, and neuroarthritics or actual neurasthenics (who are in the majority) of hereditary origin with prevailing psychic disturbances. In such cases the alterations of metabolic change and consequent poisoning of the nervous system are the foundation of the disease.

The former are individuals whose organic and functional constitutions were originally normal, but have temporarily undergone some disturbance in their organisms, more or less grave, and still preserve in their heat-regulating mechanism the power of reacting to suitable stimulus, particularly to the stimulus of cold, which when applied reawakens in them the latent energy.

In the neuroarthritics, on the other hand, the heat-regulating mechanisms, which are in such intimate relation with the functions of metabolic change, have not in themselves the energy to respond adequately to the action of the stimulus, and the physical result of the stimulus of cold is to unbalance the circulation.

In other words, since in these individuals the reaction is not effectual or is incompletely effectual, the great peripheric net of vessels remains wholly constricted, resulting in a great increase in blood pressure, which is already abnormally high in the majority of cases, and a greater difficulty of eliminating and transforming finally the products of metabolic change, which tend to poison the nerve centers is induced.

From these ideas of physiopathology springs, evidently, the indication for procedure in these cases diametrically opposite—the stimulus of heat to be substituted with the object of producing in them primarily, and not by reaction, an ample dilation of the peripheric net of vessels, capable at the same time of lowering the general pressure of the blood and of favoring with a more active circulation and an abundant perspiration the elimination and dissolution of the waste products. Naturally, thermotherapy should be strongly aided in this effect by a rational employment of muscular exercise, either in the form of agreeable sport, or by means of mechanical therapy which has the advantage of measuring with precision the exercise which may be permitted to each patient. And all this without neglecting the auxiliary treatments most appropriate, such as galvanization, currents of high frequency, suitable dietetic régime, treatment with mineral waters, etc.

Hereafter it should not be considered marvelous that the hydrotherapeutic establishments of high reputation, as elsewhere the cabinets of electrotherapy and kinesiotherapy, are going to be transformed gradually into complete institutions of physiotherapy, to the immense advantage of the sufferers and with not indifferent usefulness to themselves.

There is need therefore that the physician be convinced that there are very few forms of disease to which he can still apply the herbal method of former times. The conscientious physiotherapist should be prepared to employ all the physical agents the efficiency of which has been scientifically demonstrated, and should be able also, as the ordinary physician does, to dispense the drugs of the pharmacopeia.

The necessity is indisputable of instituting the systematic study of the practical application of physiotherapy upon a basis which, large as it may be, will be fruitful in well-merited success.

An ideal institute of physiotherapy should include under its hospitable roof subdivided and really distinct departments, but convenient to each other, so as to form a harmonious and synthetic whole with at least the following departments:

(1) Hydrotherapy, represented by a ball for pressure douches, furnished with all the connections fitted to apply general and local douches, with various forms of jets with various combinations in temperature, and supplied with instruments of precision for the measurement of the fundamental factors of hydrotherapy, temperature, pressure, and duration.

(2) Kinesitherapy, which should comprise cabinets for manual massage, equipped with plinths and tabourets of Swedish model, the most convenient and best adapted to the object, and a hall of medical mechanical gymnastics furnished with a complete collection of apparatus for passive and active exercise, for massage, vibratotherapy, and other mechanical operations, which are realized in the perfect and the not yet surpassed system of Zander.

(3) Mechanical orthopedia for the treatment of curvatures and of deformities of the bones, to which may well be added a surgical room for bloody orthopedic operations.

(4) Electrotherapy, with electro-static machines and apparatus, electro-dynamic for continuous currents, faradic, sinusoidal, and triphasic, pulsating or undulatory, for the currents of high frequency, and of high tension à la d'Arsonval, and knuckles for the discharges of condensers à la Zanietowski. This department should be furnished also with the accessories for the application of hydroelectric baths, general and partial, including a 4-cell for electric foot and hand baths.

(5) Roentgen rays, for which the need is twofold; first, because radiography and radioscopy are now indispensable for an exact diagnosis, then, because radiotherapy has taken on already such a development as constitutes by itself alone a notable movement.

(6) Phototherapy, constituted principally of the original Finsen apparatus and of other models of more moderate dimensions but equally effective (Finsen-Reyn) and equipped with diapositives for the application of colored light, of cold diffused light, etc.

(7) Thermatotherapy, a very important department, which should comprise all the forms of application of dry heat. Roman or Turkish baths, Kellogg baths of light, Downing apparatus for luminous radiating heat, sand baths, electric thermophores, and of moist heat, Russian baths, cabinet vapor baths, vapor douches, natural dirt, etc.

(8) Pneumatotherapy, with pneumatic chamber for baths of compressed or rarefied air, Waldenburt apparatus for breathing in or out in compressed and rarefied air, apparatus for the inhalation of oxygen, for pulverization with vapor or with compressed air, and relative inhalation of medicated substances, cask baths for mercurial inhalation, etc.

(9) Balneotherapy, with a "plant" sufficiently well equipped to admit of administering all sorts of baths with authenticated hot mineral waters, baths of carbonic acid, baths with artificial, medicated preparations, etc.

(10) Dietotherapy, which should have its own separate clinic set up; a building annexed to the institute, where the patient can be lodged and fed according to the strict dietetic rules indicated in each form of disease and for each patient. Since it should not be forgotten that now dietetics not only has become a valuable complement of any treatment it is desired to establish, be it pharmaceutic or physical, but in not a few forms of disease which fall under the domain of physiotherapy, the dietetic régime is the fundamental base, the condition, *sine qua non*, of success.

To each of these departments should be assigned one or more physicians in proportion to the intensity of the labor, in order that the execution of the treatment may be carried out personally by the physician who presides over the department, or under his direct oversight. As for the functional regulation of the departments it may be necessary that the sanitarians assigned to an institute of physiotherapy attend to one branch only, but they should not become crystallized in that one branch, but interest themselves in study and exercise in the practice of all the others. Only thus can be formed a sound therapeutical standard, without relapsing, by another way, into the error which we have deplored in the specialist.

Above all, there should be that eclecticism which is requisite in the director of such an institute. He should be at the same time an expert in diagnosis, and with perfect knowledge of all his prescriptions and of the effects which can be produced by them and above all should be in a position, diagnosis being accomplished, of working out the precise indications of the treatment to be applied, without being preoccupied if the treatment best indicated needs also research in quite another direction than that of physiotherapy. Built on this foundation and organized with standards as set forth above, the institute of physiotherapy will know how, in a short time, to employ itself on the ignorant and the skeptical and will be in a position to bring to suffering humanity all the immense benefit which results from the multiplicity and solidarity of the means at its disposal and which is expressed in the formula, "In union is strength."

PERIPHERAL NEURITIS.*

BY FRANCIS B. BISHOP, M. D., WASHINGTON, D. C.

Member Medical Society, D. C.; Member and Ex-President Medical and Surgical Society, D. C.; Member and Ex-President American Electro-Therapeutic Association; Member American Medical Association; Member Society Electro-Therapeutics, Paris, France; Delegate from American Electro-Therapeutic Association to International Congress Physio-Therapy, Liege, Belgium, August, 1905; Delegate for the United States to International Congress Physio-Therapy, Liege, Belgium, August, 1905; Member Medical Society of Northern Virginia; Member Therapeutic Society, D. C.; President American Committee, International Congress Physio-Therapy.

When we speak of peripheral or multiple neuritis one is naturally led to believe that this is a disease primarily of the peripheral nerves; that the toxic or infectious agents attack at once the nerves of the periphery, leaving the gray matter of the cord and the roots of the nerve free and in a normal state. Indeed, many, if not all of the older authorities so consider it, while more recent investigations have found in a certain number of cases some changes in the gray matter of the cord. Some of the toxic agents that produce this condition seem to have, by selection, a special action upon the gray nervous matter, such, for instance, is alcohol; which is said to be the cause of more cases of multiple neuritis than all other agents combined. From the similarity of symptoms in many cases arising from various causes, it would seem that all the toxic or infectious agents producing these symptoms have the same or similar selective action upon the gray matter and that in peripheral neuritis this action is directed to the gray matter of the spinal cord and to a limited extent often to the gray matter of the brain.

The disease makes itself manifest most frequently at the extremity of those nerves coming from the lumbar and sacral plexuses. (These plexuses are formed at that portion of the cord having one of the two enlargements and containing the greatest amount of gray matter in the gray commissure.) It gradually involves the limbs, skipping the thoracic nerves, and attacks the extremity of those nerves coming from the other great enlargement of the cord forming the brachial plexus.

* Read before the Society of Northern Virginia, evening November 15, 1905, at Alexandria, Va.

While this course is not always followed, it is most common. The nerves of these plexuses supply muscles most highly specialized and most remote from their centers; so any toxic influence disturbing the metabolism in the commissural gray matter or in the ganglion cells of the anterior and posterior horns might produce a disturbance of the function of these centers and thus modify their impulses to such an extent as to cause paralysis and wasting of the muscles and pain in the nerves; especially those farthest removed from their sources of energy.

That the sympathetic ganglia and their visceral branches are affected also, is shown by the obstinate vomiting which sometimes enter into the symptom complex of this disease. That the gray matter of the brain is often made to feel the effect of the poison is suspected by the presence of delirium more or less pronounced in many cases, as well as the well-defined hysterical manifestations. For a long time there seemed to be considerable doubt in the minds of pathologists as to the spinal origin even of Landry's paralysis. In Oppenheim's work on nervous diseases, he says: "On the whole, late researches, founded upon the new methods, have almost all given positive results; and particularly alterations in the spinal cord, especially of the gray matter. They were either inflammatory and vascular conditions (arterial disease, hemorrhage, exudation, thrombosis, softening, infiltration, etc.), or alteration of the nerve cells, which rarely, however, reach the degree of distinct atrophy." This in a disease whose etiology is the same as the one under discussion and the early symptoms of both diseases are very similar. When Landry's paralysis does not end in speedy death or goes on to final recovery, there are many symptoms in common with multiple neuritis; so much so that it has been referred to as multiple neuritis acutissima.

Raymond, it is said, does not believe that multiple neuritis, poliomyelitis and Landry's disease can be sharply differentiated, as they arise from the same cause. That these diseases are produced by the same toxic or infectious influence is no longer denied, and, in the opinion of the writer, in multiple neuritis this influence is exerted directly, on the gray matter of the spinal cord and sometimes even on the brain. If it be true as here suggested, that in an ordinary case of multiple neuritis, the metabolism of the cells in the gray matter of the spinal cord is modified or partially suspended by the acting poison; it is but

reasonable to conclude that any method of treatment that would reach the cells of the nerve trunks going directly to them in the form of gentle stimulation, would assist them to resume their normal action, and by increasing the blood supply to them help to establish normal metabolism. By this method we may greatly relieve the suffering of the patient and aid nature to throw off the effects of the accumulated poison, whatever it may be, and thereby increase the natural tendency in the direction of health, a tendency always in operation in the diseased tissue of the body when the influence against it can be subdued. When electricity is properly and carefully used it will do much to relieve the suffering of the patient and shorten the period of convalescence. When improperly and carelessly or ignorantly handled, the suffering can be easily intensified and the disease prolonged.

In endeavoring to influence the spinal cord by electricity it is well to remember the numerous and more or less dense coverings through which the current has to pass in order to reach the spinal cord. This is a wise provision of the Great Architect of the human frame, especially as it relates to the application of electricity and other physical therapeutic measures, else great harm would be done frequently in our efforts to stimulate the spinal centers; even as it is, I am not sure that the present methods advocated in the use of vibratory therapeutics, while susceptible of much good, do not often do great harm. There can be but little doubt, however, that when the continuous current is used in sufficient volume with the electrodes carefully arranged, enough current may be made pass to attack the centers directly or may be indirectly through its action upon the spinal nerve trunks to produce all the stimulation needed in this disease. But I believe there is little reason to doubt that a certain proportion of the current will pass directly through the ligaments, and even the spinal vertebræ themselves, moistened and saturated as they are with blood, serum and lymph into the spinal canal and through the covering of the cord into the cord itself.

The treatment employed is, of course, subject to variation according to the stage of the disease and the condition of the patient. If the disease is post-febrile and due to the toxic or infectious effects of a prior disease, it is much simpler than if due to alcohol or the use of drugs; for in the latter case we not only have to treat the disease itself, but we also have what might be called a habit neurosis with which to contend. It is fully

understood that the use of all agents that have a tendency to cause multiple neuritis, if being used must be discontinued. If the patient is up and still able to get to my office I have found the use of the static breeze gently sifted over the body, back and front, while the patient is comfortably reclining, to be of great benefit. If the patient can be made comfortable this treatment should last at least half an hour. Here we get three most important effects. (1) We place the patient in an electrostatic field where pure ozone is generated in abundance, thoroughly mixed with atmospheric air, and this he is compelled to breathe while in this field; this alone plays an important part in the metabolism of the body. (2) The afferent nerves are so gently and continuously stimulated that they in turn cause a stimulation of the cells of the posterior horns of gray matter in the cord, these in turn send their impulses through the commissural fibers in the gray commissure of the cord to the anterior horns and they in turn to the sympathetic ganglia, and together they send nutritive impulses gently and harmoniously blended to the blood vessels and to the muscles of the diseased structure as well as to the rest of the body. (3) The patient being in the electrostatic field, has passing through his body in both directions many thousand times a minute, quiet charges of electric currents of very high potential causing the sluggish cells of the body to make their physiologic exchange, which is so necessary to the restoration and maintenance of health. After each treatment the patient should be taken home, put comfortably to bed and remain there for at least three hours. He should be allowed to do but little walking—none of it causes distress. This program should be carried out each day. From this treatment alone I have seen cases in the early stages get well, when the symptoms at first indicated a severe attack.

In most of these infectious cases we are not so fortunate as to have our patients brought to the office; we generally find them in bed with the disease fully developed before we as specialists see them. If the disease is still in the acute stage and the patient is suffering great pain, I rely exclusively upon the continuous current. Under no conditions should an interrupted galvanic current or induction current be applied in this stage, as it will invariably increase the patient's discomfort and lengthen the course of the disease. Here great patience is required on the part of both physician and patient. Skill is also required, but

patience is equally necessary. A good continuous current battery is required and four to six conducting cords, an accurate milliamperemeter, plenty of absorbent cotton and lead foil. The current should be concentrated at the cervical and lumbar enlargements of the cord, if the upper and lower extremities are both affected. If only one, the upper or lower region, is involved, we need only three conducting cords. A sheet of flexible rubber should be slipped under the patient from his head to his feet in order to protect the bed and bedding from the dampness. A towel should be folded lengthwise into several thicknesses, making it about four inches wide and doubled until it is a little longer than the enlargement of the spinal cord to be treated. If both enlargements are to be treated, prepare two towels, and then thoroughly saturate them in quite warm water and place evenly and smoothly under the patient, who should be lying on his back. A piece of lead foil should then be prepared a little narrower and shorter than the folded towel and slipped beneath it next to the sheet of rubber. Another piece of foil should be twisted over the end of one of the conducting cord tips and slipped under the lead foil making contact. The patient's legs then should be wrapped evenly and smoothly from the toes to above the knees with the dry absorbent cotton; after which the cotton is to be thoroughly saturated with warm water and carefully and smoothly wrapped with a sheet of lead foil, and connected to the end of two more conducting cords in the same manner as described above, to the lead foil covering the cotton on the legs. The legs should then be carefully bandaged with towels in such a manner as to hold all in a snug and immovable position; if the arms and hands are affected they are to be prepared in the same manner. The metal tips at the other ends of the conducting cords are then to be fastened by a metal clamp which shall be connected to one of the binding posts of the battery. The free tip of the cord connected to the spine should then be attached to one side of a rheostat for regulating the current and another from the other side to an accurate milliamperemeter and the milliamperemeter should then be connected to the other binding post of the battery. As it is desirable that a soothing effect be produced upon the sensory nerves, it has been my custom to have the current flow in the direction of these nerves, the extremities being attached to the positive pole of the battery while the negative pole is attached to the spine. You will see by this that the current is diffused over much surface represented by the painful peripheral nerves which are near the surface and is concentrated at the place or places where it has to pass through much dense tissue to reach the spinal cord or the spinal nerve trunks. The current should then be turned on gradually through the rheostat and not increased after the patient begins to feel heat beneath the electrode at the back. If by chance the current at the electrodes at

the extremities is felt first, the current should be held at that point, provided it produces no discomfort. If it does then it should be lessened until all discomfort from the current disappears. The milliamperemeter should be carefully watched and the current kept at that point for at least half an hour if the patient experiences no pain or discomfort from the current or wrappings. The treatment should be given at least once in twenty-four hours. A labile application can only do harm at this stage of the disease. When the acute stage has passed and the patient is subject only to the paralysis without pain, then we may, with great benefit, use the labile application to the paralyzed muscles with a large sponge hand electrode, using very weak currents at first, applied with light pressure without removing the electrodes from the limb while the current is passing. As the case progresses favorably we may use stronger currents, but never at any time a current that will cause discomfort. By degrees we may make and break the weak currents, still using the large electrodes, until eventually we get to the point where we may treat the paralyzed muscles in the regular way without causing discomfort. I have seen a class of cases suffering from alcoholic multiple neuritis that have in the subacute stage been greatly benefited by the application of the induction current. The patients were then practically over the pain and tenderness along the trunks of the nerves, but suffered intensely from cramps in the muscles of the calf and in the soles of the feet. In these cases I applied a pad at the back and one at the soles of the feet, gradually turning on an induced current of high tension not beyond the point of tolerance. In some of these cases I have seen the patients fall asleep during the administration of this current. The greater part of the treatment in the acute and subacute stages should be applied, in the majority of cases, to the extensor muscles. The legs should be kept as straight as possible during the illness of the patient in order to overcome or prevent contraction which is so liable to take place, and thus prolong the convalescence of the patient.

In the paralytic stage when all pain and tenderness has subsided, we may use, with much benefit and no fear when used correctly, the interrupted direct current, and the induced current, picking out each paralyzed muscle and stimulating it to contraction.

The ideas and methods set forth in this paper are those which I have followed in the treatment of this slow and painful disease. While the process is very tedious it has been followed by very fine results. That they are open to criticism I will admit, but after all we must follow our path as we see it most clearly, and remember that those things which we do best are those things naturally which we best understand how to do.

THE IMPORTANCE OF VIBRATORY RATES FOR THE INDUCTION OF TISSUE RESPONSES.

BY MORRIS W. BRINKMANN, M. D., NEW YORK.

(1) Vibratory rates, and their range by absolute measurement.

(2) Reaction of tissue to them.

In a general way, cell life as an isolated entity cannot be considered in connection with vibratory rate. We are all of us too well aware of the fact that no cell is independent of its connection with, first, the nervous system; second, the blood circulation, and, third, its lymphatic relationship. When we, therefore, speak of the reaction of tissues to any agent, either pressure or movement, we must, to a very great extent, conceive of the multiple actions which are going on, not alone in the protoplasm of the tissues of the part under treatment, but in the connections of that local tissue with all other parts of the human economy.

We must also conceive clearly what the meaning of reaction is, in the tissue under manipulation as well as the connection of our procedures locally with all other tissues. We expend a form of energy locally and the local counteraction is enhanced by the propagated impulses through reflex action from the rest of the economy.

A. To deny this is tantamount to the assertion that reflex action does not exist. We must, therefore, concede that there are under the influence of certain energy expenditures, derivative actions of an unquestioned character. Their degree naturally and of necessity being in direct proportion to the extent of local force application. Derivative, therefore, as to the nervous, hematic, circulatory and lymphatic systems.

B. A peculiar action of the central nervous system connected with the part, subjected to any energy application must also exist, or if denied we must again deny the existence of reflex action. Again the peculiarity and intensity of the action would depend upon the energy expended and the duration as applied to the periphery.

The question of rate will be discussed at another point.

We have, therefore, afferent and efferent impulses with ac-

tion of the particular nervous center, as well as some degree of action in the co-ordinating centers. That is concentration of— (1) sensory, (2) perceptive, (3) intellectual, (4) co-ordinating, (5) volitional activities, in the direction of the manipulated areas.

C. The action of energy on isolated protoplasm has been carefully studied by many observers, but can have no clinical value, for the reasons already cited. Quantities of energy to an extent that are destructive of life in protoplasm will not be considered, for dead tissue cannot react, in any reasonable use of the term.

In several papers which have already been read by the writer, it has been stated that remarkable phenomena result from the application of different vibratory rates, (1) single, (2) double or multiplex, (3) harmonious or inharmonious, (4) persistent as to rate or pitch, or (5) varying as to rate or pitch. It is improper to inject into this intricate problem, at this point, the question of intensity or amplitude of vibration. The vibratory rates, which are under immediate discussion, extend from 15 or 20 per second, in continuously increasing velocity to a point where they are infinite in rapidity, stated to the lay mind, a speed beyond the comprehension or computation of any mind. We have slow speeds, conceivable by the senses up to perhaps 40,000 per second for the ear; common sensation goes much higher, for we can estimate heat by our sensory peripheral apparatus (so-called temperature sense). The eye can recognize oscillations, whose speed reach many millions per second up to the end of the visible violent end of the spectrum. The nasal and gustatory sense cannot enter into a rational discussion as the data are insufficient—since we know not whether the action of taste and smell, depend upon the mechanical stimulation or the mechanico chemical or chemical or vibratory action.

Rates beyond the perceptive capacity of the unaided sense organs, possess the ability to call forth reaction. For example sunlight as light with the heat filtered out, can produce erythema and secondarily tanning. The chemical reaction to the X-ray, in the tissues as also the biological one, both of which are unquestioned. Whether these two cases are purely the result of vibratory rate is to some extent open to question. Since the

ionic action, the foot-pound action and the nervous system, inject questions of great complexity.

The essential factors of vibratory or undulatory action are (1) intensity or quantity, (2) quality of rate. If a blow of definite intensity be applied a definite number of times in a unit of time, we must assume that when the same intensity is maintained and the blows are applied twice as often in the same time unit, the effect would be twice as great, since we have $r \times t = e$ —where r =rate, t =time and e =effect. Throughout nature, upon inanimate matter this law holds good. We will again, however, simply refer to the fact that biologically there is always to be considered appreciative capacity or sensorium and reflex action. For high rates the same principle applies as to resultant effects.

Rate, therefore, is an important factor for our consideration, whether simple, as in the case of a musical note; a specific color, or a definite temperature. Or, again, compound, as in the case of a harmonic sound combination, as a musical chord; or a secondary color of the spectrum. Multiplied as in the case of many coincident sounds, producing simply noise, or again white light as a result of the combinations of all the spectral vibratory rates.

We have, then, the lowest rates acting, either through mechanical methods, such as mechanical vibration, electrical methods as the induction currents, low rate wave current, low rate static induced—even a low pitch musical rate—all of these give the reactions of slow vibratory rates.

Following this come the complex rates of every form of motion below the lowest heat rays. The tri and bi-infra red of the spectrum.

Harmonic or inharmonic forms of undulatory energy. These are all compound or complex, as would be the case when heat and light rays or undulatory currents were mixed.

The thermic rates are next in order. These cover a very wide range, since cold is relatively a degree of heat. We can speak of hydrotherapy, thermotherapy, climatology—where temperature considerations are the leading factor in practical application; liquid air to the actual cautery are included in the thermic rates. Phototherapy is embraced in all the rates as found in the visible spectrum, from the red end to the violet, the ultra violet is probably better considered separately. Its presence can be detected by the glow of willemite, its rate more rapid, its

wave length shorter, its effects distinctly different, especially the chemical and sedative effects.

Next in order come the cathode rays, as found in radium, polonium, etc. Beyond this we reach the X-ray with all of its peculiar manifestations. The high frequency currents as derived from condensers of very small capacity, a large charging source with a small spark gap. Limitless velocity can be obtained by the relationships of condenser, charging quantity and spark gap. The velocities have been computed in practical apparatus to reach five billion per second.

Measurement of velocities and wave length:

The velocity of sound in air is 1093 feet per second, the wave length is determined by dividing the number of vibrations per second into this number. We then have the lineal measure of the individual wave lengths. The number of vibrations is determined by the siren or chronograph method. The estimation of wave lengths for the different portions of the spectrum is established with a very high degree of accuracy, by fixing with a micrometer screw the difference in position of the cross wire of a telescope; upon either the bright lines of the incandescent spectrum, or the dark interference bands.

The length of the undulations have been established as follows:

At dark lines in decimals of an inch.

B at red and orange.....	.0000271
C at orange and yellow .....	.0000258
D at yellow and green.....	.0000244
E at green.....	.0000207
F at green and blue.....	.0000191
G at blue and indigo.....	.0000169
H at violet .....	.0000155

or again on color basis.

Hertzian wave lengths, several meters:

Infra ultra red.....	18. mic.
Ultra red.....	8.
Red .....	.71
Orange .....	.66
Yellow .....	.62
Green .....	.53
Blue .....	.40
Indigo .....	.41
Violet .....	.38

Ultra violet .....	.21
Ultra, ultra violet .....	.1
X-ray .....	.014

The reactions of tissue to varying undulatory rates are moderately and measurably well known to all physicians employing physical methods—a brief review would not be out of place at this time. The longest wave lengths having a greater oscillatory length, are, all things considered, the most competent to impress and call forth reactions in tissue. Therefore low rates, mechanical vibration, low pitch faradism or induction currents, the wave current with small or moderate spark-gap, the various applications of cold, are all when briefly applied of a tonic nature, since the reactive powers are only moderately developed and call into play efferent reflex nerve impulses, that vitalize and potentize tissue. Overuse of these agents would develop inhibition and palsy, as would be the case with all oscillatory movements upon tissue when too protracted.

High pitch alternating induction currents, large spark gap wave currents, high discharge rate of static induced current operate as sedatives on tissue when reasonably applied more vigorously as analgesic.

Caloric rays at the infra red and red end of the spectrum must have analgesic properties in a higher degree than the last. This property must become progressively of greater and greater importance as we rise in the scale of speed and shortening of wave length, through the different spectral rates and beyond as far as the X-ray.

Any excessively protracted application must produce degrees of reaction in proportion to the exposure, from superficial erythematous to ulcerative processes.

In protracted X-ray exposures we have clinical histories of tissue so devitalized as to become leather-like. Even ulcerative results have been noted, though rare. These latter cases are examples of such inhibition that reaction is almost impossible.

The high frequency current is capable of producing a primary anemia followed by intense congestion and even exudation. When protracted application was made ulceration has been noted; although, of course, a high milliamperage in such cases has been sparked upon the tissue. General reaction is secured by protracted applications of any vibratory movement. Cold affusion, low pitch alternating induction currents (faradism)

when protracted causing general relaxation, as also all forms of high oscillatory rates when too long continued. The X-ray when too long applied, must follow the same general law, aside from toxic absorption from destructive tissue metamorphosis. The high frequency current from coil, fed with heavy currents and run through D'Arsonval and Oudin apparatus, unquestionably elevates temperature; whether this is due to vibratory rate alone is questionable, as 110 volts and 5-10 amperes mean from 550 to 1100 watts, therefore 2-3 to 11-2 horse-power, or 22,000 to 50,000 foot pounds, or assuming the usual factor of a heat unit as 1390 foot pounds we have 15.82 to 36.07 thermal units, certainly sufficient to account for the heating effects without vibratory action, unless we regard the vibratory action in the light of a carrier of energy, which it certainly is.

Conclusions: A (1) We have known and measured vibration rates—from the slowest up to infinity, means of producing and applying them.

(2) Results partly known and partly unknown in the reactive capacity of tissue, heating, nervous phenomena, circulation, metabolism, etc.

(3) General effects upon (a) nervous system, (b) circulation of blood, (c) circulation of lymph, (d) temperature.

These are all tonic.

B. Under this head come the sedative effects from the higher rates.

C. The inhibitory effects due to long exposures or high vibratory rates.

D. Destructive effects—due to excessive exposure to high rates carrying heavy amounts of energy.



ETHERICAL AND MECHANICAL VIBRATION.

BY M. F. SETTERS, M. D., SPOKANE, WASH.

That a popular wave among the profession and laity in favor of electricity is spreading over the country, is evidenced by a letter of inquiry addressed to twelve different manufacturers as to what, if any, was their increase of sales. The amount of increase was astounding to me. One manufacturer of coils stated that his sales were over 400 per cent. greater the past six months than over any preceding period, and one static manufacturer sold over a thousand machines during 1905, all of them claiming great gains in their sales.

This increase in the use of electricity can be explained in part by the era of prosperity which our country is enjoying, enabling the physician to purchase static machines and coils, but not entirely.

Such men as Massey, Morton, Snow, Jacoby, Herdman, and others, have shown us that it is a beneficial adjunct to the practice of medicine and becoming a necessity in the handling of diseased tissues, but to properly discriminate as to what method or methods can be best adapted to a certain pathological process, remains for careful experimentation and study to discover. If we should endeavor to search recent literature as to the best methods of treating a given case, we would find a number of them which are so nearly applicable to the treatment of the same disease, that it is almost impossible to say whether it should be treated with X-ray, radium, static wave current, breeze, spark, by some of the light rays or mechanical vibration, since their therapeutic effects are so nearly akin to each other.

Looking over the articles of able men, I find, in the treatment of neuritis, the static spark is advocated by some, the wave current and high potential currents by others, and still others advocate the use of the X-ray, ultra-violet light, leucodescent light, and some of the continuous current.

The same may be said of many other diseases, the writers treating each of the methods mentioned as an entirely separate and distinct treatment from any of the others, while in fact they are practically the same, differing only in the degree and rapidity of vibration.

Each depends for its therapeutic effect upon oscillation of the cellular protoplasm, produced by the vibration of the etheric waves or by direct contact of a vibrator, and in using them we are only using nature's methods of stimulation and vibration.

Exclude light, and we exclude one form of vibration; exclude sound, and we exclude another; and we all know the effect upon animal and vegetable life, if placed in a dungeon from which all light and sound are excluded—how it wastes and dwindles away and dies from the effect of insufficient stimuli to the cellular protoplasm.

How often do we find the curtains drawn and the room in darkness and quietude when death is drawing near, thus robbing the patient of nature's only opportunity of stimulating and resuscitating the dying cells.

While I do not wish to theorize, I think it would not be far-fetched to say that the whole animate life of the universe depends for its existence upon vibration, just as much as it does upon the "life-giving oxygen."

Vibration may be divided into two classes:

1. The Direct or Mechanical, as induced by various mechanical contrivances, which, when placed in contact with an organism, transmits its oscillations directly to the body, these vibrations varying in rapidity from 200 to 7000 per minute.

2. The Indirect or Etherical, by means of which vibrations are transmitted to the cellular protoplasm through the etheric waves.

In this class may be placed sound or harmonic vibration, light, electric currents and electrons, they differing in the degree of rapidity and length of wave.

Sound, producing waves of ether, impinges on the cells, and causes an oscillation of the cellular protoplasm similar to mechanical vibration, but differing in the degree of rapidity of the oscillations.

Doctor Brinkmann claims it to be a valuable therapeutic adjunct, and he says that "Tension, thickness and length may regulate the particular note to which a muscle, nerve or other tissue may be attuned or respond."

Light is another form of etherical vibration, ranging in rapidity from infra-red to ultra-violet.

The visible spectrum varies from 390,000,000,000,000 vibra-

tions, producing the color sense known as red, to about 760,-000,000,000,000 vibrations, known as violet. Above this, the vibrations become invisible to the human eye and are known as ultra-violet.

The Finsen lamp comprises blue, indigo, violet and ultra-violet rays. The slower vibrations are the heat rays.

The effect of light upon the living organism, shown in nature by the difference in plant and animal life grown in the dark and those grown in the light, is due not alone to the diminished amount of light, but is largely due to the stagnated condition of the cellular protoplasm, as there is usually in those conditions a lack of sound vibration also; and it is more than probable that the beneficial effects of light and its bactericidal action is due to favorable stimulation to the body cells, increasing their phagocytic action.

After passing beyond the ultra-violet waves, in rapidity, we get electric impulses. That electricity is not a separate and distinct entity from the foregoing, is shown in the similarity of its physiological actions.

According to the electron theory, as pointed out by Dr. Herdman, electricity is due to infinitesimal particles of matter which can be precipitated through the ether, or less resisting matter known as conductors. When they meet a resistance, changing their direction, waves of ether result.

The electrons themselves are supposed to be the cathode rays and rays which emanate from radioactive substances.

Accepting this theory, we have only to consider the effects of rapidity of the electric waves and electrons upon normal and pathological tissues as differing from mechanical vibration, sound and light, together with the polarity and conductivity of the various tissues, to produce the best results in any disease.

The difference in polarity is easily summed up. Positive insulation, in whatever form used, raises arterial tension, the negative lowers it; the positive is soothing and sedative, the negative stimulating and irritating.

The electric vibrations may be made to vary from the very rapid, as from the continuous current and static breeze, by a break in the current as in the faradic, sinusoidal, static spark and high frequency, giving a succession of etheric-vibratory-showers, followed by an interval of rest, which may be made to vary from slow to rapid at the will of the operator.

The slower etheric-vibratory-showers, as from the static wave-current, are especially indicated where a deep-seated effect is desired, whether stimulant, tonic or sedative, such as in myasthenia gastrica, or other derangements of the internal

organs, and I have found the static current especially to be of the utmost value in acute and chronic prostatitis, as introduced by Dr. William Benham Snow, of New York.

Chronic prostatitis treated surgically gives a mortality of about 25 per cent., with 15 per cent. of the cases treated in worse condition than before being operated upon. Dr. White-side claims a good result in only 30 per cent. of his cases treated surgically.

I have treated a number of cases having a duration varying from one to fifteen years' standing with positive results in 90 per cent. of the cases treated and with improvement in 100 per cent., and neither bad results nor mortality.

Here, perhaps, we could attain the same result with mechanical vibration, but it would be more impracticable because of inaccessibility and lack of polarity influence; the static by sending successive etheric-vibratory showers, its polaric influence, the accessibility of the organ to the electrode and the conductivity of the mucous membrane from natural moisture, offers us the ideal method.

The more rapid vibrations, as given by the high frequency, are more applicable to treatment of surface conditions, such as diseases of the skin, mucous membranes and endometrium.

The more rapid the vibrations the less pain, as it is a well-known fact that a very high frequency produces analgesia, whether it be mechanical or etherical. Skin diseases are more amenable to this high frequency, and it is the rule instead of the exception to see cases of both acute and chronic inflammatory diseases fade away under its influence as though under the wand of some magic hand. Cases of sycosis that under medicinal treatment take from three to four weeks to effect a cure, now get well under three or four treatments, and chronic cases that stubbornly resist all efforts on the part of the physician to cure with sulphur, tar, resorcin, etc., yield readily to its influence. Light rays give us similar results in those cases and are perhaps more applicable to the deeper inflammatory diseases of the skin.

The extremely rapid vibration as thrown off from the X-ray and the penetrating influence we get from the electrons give us the best results in conditions of stasis and hypertrophy; its use in malignant conditions can be said to be a palliative measure only, and in no case should the surgeon's knife be stayed where an operation can successfully eradicate the cancerous tissue. In inoperable cases the use of the X-ray may prolong life for a short time.

The greatest use of the X-ray is in the hands of the diagnostician for radiography, and in that case only does the coil take supremacy over the static machine, as in all therapeutic measures its use is not attended with the same excellent results as given by the static machine.

Editorial.

THE RELATION OF PHYSICAL PROPERTIES TO PHYSIOLOGICAL EFFECTS IN ELECTRO-THERAPY.

THEORIES of action of electrical modalities that fail to recognize physical laws are not only inconsistent but certain to be fallacious.

To assume that the static modalities are superficial in action because electricity surrounds bodies in the state of charge, is to ignore its kinetic properties when assuming to induce a state of charge of a body or the subsequent discharge in accordance with the laws of conduction. To assume that the static current passes over the skin to surround the body of the patient when the skin is many times a poorer conductor than the underlying tissue, is in variance with facts or possibilities, and yet writers still make this error. As a matter of fact, no form of electrical current so universally pervades the tissues and cells of the body as the static during the periods of taking and discharging, in fulfillment of the natural law of electric conduction, when the patient is insulated.

Spinal electrization by the continuous current is of most doubtful accomplishment when we realize that a current of low voltage is certain to flow by very circuitous courses along a good conductor, even when another good conductor is near but separated by a poorer which insulates it. The saline fluids are the best conductors and posteriorly cannot pass to the cord, for the flux in and out of fluids is from the anterior side.

* * *

PROFESSIONAL SKEPTICISM.

THE extent of professional skepticism, marked by a degree of insolence and bigotry, displayed in many instances by those who admit ignorance of advanced methods, is not only surprising but dishonest to the cause of humanity.

No truly *great* man will ignore, much less deny, the possibilities of progress in the development of mechanical therapeutics which he has never investigated. The truly great recognize ability in others, and strive to stimulate and not block progress. To condemn without first investigating is unfair to those it may influence, and indicative of weakness.

In no department of medical science is ignorance so generally marked as in the knowledge of the indications for the employment of physical therapeutics. The great schools, hospitals, and laboratories are generally closed to those who seek to carry out scientific research in these directions. Why this narrowness, this unwillingness to let the light shine in? It seems like the conceit of small minds fearful lest their own stupidity be discovered; or what could only be imputed to the baser natures, that it might be a means of "killing the goose that lays the golden egg."

It is difficult to discover with certainty the motive of such opposition; too contemptible it would seem to have a place in a great profession.

* * *

THE SIXTEENTH ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSO- CIATION.

Arrangements have been made for the next meeting of the Association in Philadelphia on the 18th, 19th, and 20th of September, 1906, notice of which is given in the following letter received from Dr. G. Betton Massey, chairman of the Committee of Arrangements:

EDITOR ADVANCED THERAPEUTICS:

Sir: The members of the American Electro-Therapeutic Association may be interested in a brief account of the plans outlined for the Annual Meeting in Philadelphia next September.

Arrangements have been made for holding this meeting in the

Hall of the College of Physicians of Philadelphia, where the first scientific meeting of the Association was held in 1891.

The College of Physicians of Philadelphia is the oldest medical society in America, having been founded in 1787, and its present building was for many years the most elaborate structure erected specially for this purpose in the country, and is yet most comfortable and interesting, though plans are under way for a new building. Its library, under the same roof, is, I believe, the largest collection of medical books in America, save that at the Congressional Library at Washington.

A room has been secured in the same building for an exhibition of apparatus. This room is directly adjacent to the entrance, and, though small, will give an excellent opportunity for manufacturers to display the latest products of their work rooms.

It has already been ascertained that the Association will be entertained at lunch at two institutions, the Oncologic Hospital and the Medico-Chirurgical Hospital, where demonstration clinics in the cataphoric operation for cancer, and high-frequency currents in eye diseases, will also be probably given. It is hoped, also, that arrangements can be perfected to show the members and their families the various historical places in the city.

This "between-the-acts" menu will thus endeavor to mix some new things in science with the old things of patriotic American history in a way that should make this meeting interesting to all.

The Committee of Arrangements will be glad to see a good attendance at the meeting.

Yours truly,

G. BETTON MASSEY.

Progress in Physical Therapeutics.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

"Observations on the Use of the X-Ray in the Treatment of Certain Diseases of the Skin." By Fred Wise, M. D., Assistant Radiotherapist New York Skin and Cancer Hospital, Medical Record, January 20, 1906.

The writer gives a short history of the early use of X-rays in the New York Skin and Cancer Hospital and of the gradual bringing of order out of chaos in developing, as far as the hospital is concerned, a definite set of rules by which certain cases are ruled out for the X-ray treatment in the clinic, and only those cases found by experience to be specially amenable to X-ray are admitted.

Tinea tonsurans, or ringworm, and favus are all treated by means of the X-ray, and he considers that it is far the best method of procedure in these cases and is really very satisfactory. Tinea barbæ and tinea cruris are also subjected to the same method of procedure, and splendid results are obtained. The first class of cases hardly ever relapse, while the tinea barbæ is likely to do so to a slight degree. Sycosis staphylogenes, pityriasis rubra, and the hypertrophic form of lichen planus react very favorably to X-ray.

He points out that in all skin and other cases all adjuvants, internal and external, should be employed, and not to depend too much upon the X-ray alone. He considers the gloomy prognosis of 'mycosis fungoides,' which is a very rare disease, much improved since the advent of the X-ray. They have had four cases only in the hospital, two of which have died, but the prospect is good for two.

The X-ray has been more written of and talked of in epithelioma than in any one disease; in fact, it has made and lost more in this one disease than any other. It is the rule at the hospital where excision can be carried out easily and well to excise; where this cannot be done, or where it is too extensive, the use of the ray is employed. He points out while many cutaneous epitheliomas are cured and leave a beautiful cicatrix, occasionally there would be found one on which the ray would have no effect.

Patients at the hospital with malignant diseases of the skin come under two headings for X-ray: those who refuse operations, and those where there is such an extent of disease and where it is so inaccessible that operative procedure is unadvisable. He thinks recurrence is frequent in the periphery of the scar, but claims they are easily removed on repetition of

treatment. He thinks many of the surgical cases should be followed by the ray. Rodent ulcer is more difficult of management than epithelioma; while great improvement takes place, it is more liable to recur and is really more difficult to heal. In "psorospermosis follicularis" (Darier's disease) the feet were cured and the patient able to attend to her housework after all other methods had failed. A case of "idiopathic multiple hemorrhagic sarcoma" is now under treatment at the hospital with very promising results.

In conclusion he says: (1) "The X-ray will cure ringworm and favus on the hairy skin more rapidly and reliably than any other method of treatment. The advantages of the method are that it is painless, harmless when properly used, and thorough, and that it cuts down the expense incurred by the city in the treatment and care of these patients to a very considerable extent. (2) Hypertrichosis should be treated by electrolysis, not with the X-ray. (3) The X-ray gives very satisfactory results in the various forms of cutaneous tuberculosis; in keloid, in keratosis, in infiltrated patches of chronic eczema, lichen planus, pityriasis rubra; in tubercles, ulcers, and tumor masses of mycosis fungoides, psorospermosis and sarcoma. (4) X-radiation relieves pruritis, burning, tingling, and pain; it decreases the discharge and foul odors of various dermatoses, often causing them to disappear completely. (5) In selected cases, radiotherapy is the ideal agent in the treatment of epithelioma and rodent ulcer.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

Hydrotherapy in Pediatrics.

Barts says that he has never derived such satisfaction in treating febrile diseases in children, especially scarlet fever and cholera infantum, as since adopting the use of the tub bath in all severe cases. As to temperature, the same results can be had with a bath at 90° for a child that would require one at 70° for an adult. In all ordinary cases ten to twelve minutes' duration is sufficient; in some cases, five to eight. The soothing effect of the cool bath on the child is a strong argument in its favor. The benefits of the bath are greatly increased by the free application of cold water to the head while the child is in the tub.

Hot baths are indicated, not in acute febrile conditions, but in the chronic stage characterized by exhaustion. Sometimes a thorough sponging or a wet pack, cold or hot, will give as good results as a tub bath. Water is also beneficial when used internally. In cholera infantum and other gastro-intestinal disorders, milk diet should be stopped, and the stomach irrigated and the large intestine washed out with normal salt solution.

The irrigation of the bowels should be continued two or three times daily in all severe cases of entero-colitis. (Cleveland Med. Jour.)

Fresh Cold-Air Treatment of Pneumonia in Infants and Children.

W. P. Northrup (in Medical Record) reports two cases of pneumonia in infants, in which the windows of the sick-room were kept open day and night; both children recovered. He believes it will become more and more the rule to treat pneumonia in this way. Cool, pure air, he says, reddens the blood, stimulates the heart, improves digestion, quiets restlessness, and aids in overcoming toxemia. He concludes with the following prescription for killing a baby with pneumonia: Crib in far corner of room, with canopy over it. Steam kettle; gas stove (leaky tubing); room at 80° F. Many gas-jets burning. Friends in the room, also pug dog. Chest tightly enveloped in waistcoat poultice. If the child's temperature is 105° F. make a poultice thick, hot, and tight. Blanket the windows, shut the doors. If these do not do it, give coal-tar antipyretics, and wait.

PSYCHO-THERAPY.

EDITED BY LESLIE MEACHAM, M. D.

In an article on Suggestive Therapeutics, in The Medical Times for March, Dr. W. T. Marks says: ". . . Suggestion as a therapeutic agent is useful in helping the individual to gain mastery over himself, to strengthen his will and bring out his latent forces, and, in fine, build up his individuality. In order to accomplish this, certain conditions are essential. There must be an exercise of faith on the part of the patient—a faith inspired by confidence. This is usually the result of a harmonious mentality existing between the physician and the patient. . . . It is not animal magnetism. It is simply whatever appeals to the patient's imagination, which in turn produces ideation influencing bodily functions. . . . We do not know how much to attribute to our drugs and how much to the auto-suggestion they inspire in our patients. . . . The Hahnemannian searches out symptoms, not a disease name, and applies his remedy to the symptom in hand. The patient thinks of his symptom and associates with it a so-called specific for its alleviation, thus creating within himself a powerful auto-suggestion. A regular physician had failed in all remedies for enuresis in a little girl. A Hahnemannian cured her with the sixth potency of sepia, one pellet every half-hour. The regular physician began using the same remedy in similar cases with good results, finally using, in the place of sepia, sugar pellets with invariable success. . . . Suggestion alone or with drugs

is useful in all functional ailments. The various neuroses resulting from neurasthenia and hysteria are amenable to suggestion if judiciously applied. When much good is expected from verbal suggestion a passive receptive state of mind must first be secured. A thought repeated over and over, but couched in different words, will finally make an impression."

Potency of Suggestion.—J. Madison Taylor, in an editorial in *Practical Medicine*, lays stress upon the potency of suggestion and the need for an authoritative presentation of the principles. "Nine-tenths of all the patients who consult a physician exhibit mere functional derangements, and the treatment of these is usually successful on the most varied if not contradictory lines; hence it is fair to assume that whatever of efficacy lies in the medication employed, suggestion must also be reckoned with as co-operative. It should, however, be a good and wise suggestion to be effective. . . . That man is the most successful general, and often special, practitioner who best appreciates (consciously or unconsciously) the principles of suggestion. This skill is usually attained at haphazard, some instinct pointing out the way or accident forcing it upon the attention. If the personal equipment includes tact, clarity of psychic principles, sufficient dominance, one may go far working on this basis alone. If the legitimate scientific physician is often defective in this direction the charlatan is not. . . . Thus the potential of medical science, that invaluable something of faith in scientific measures, of saving efficiency, which should be felt toward the exponents of honest healing, is lowered or lost."

He argues that there is now needed "a book containing a clear, concise, authoritative presentation of the laws common to both religion and medicine, dealing with those points wherein they come in contact. . . . Taking advantage of the fact that nine-tenths of the ailments for which physicians are consulted have to do with psychic misinterpretation of actualities, religious sects (as the Eddyites) have from time to time endeavored to usurp the function of scientific medicine, claiming that the practice of medicine is almost useless, if not actually pernicious. . . . Individual medical men often fail to grasp these principles sufficiently, and it frequently happens that in certain cases they fail to cover both sides of the problem." He urges "The co-operation of one or more thoroughly wise and experienced physicians, clergymen, and psychologists who shall jointly prepare a concise text-book upon the principles of suggestive medicine which shall serve as a guide for medical men, clergymen, and others."

STATIC ELECTRICITY.

EDITED BY J. H. BURCH, M. D.

A Non-Operative Method of Treating Prostatitis. By William Benham Snow, M. D., Medical Record, January 13, 1906.

In a communication presented before the Clinical Society of the New York School of Physical Therapeutics, May 19, 1905, Dr. Snow reviews in a most masterful manner the etiology, pathology, and treatment of prostatitis.

Dr. Snow affirms that in electricity we have a certain relief for all cases except those in which a malignant or tuberculous process is present, or cases in which there is fluctuation from the presence of pus. The degree of success of the treatment depends upon the amount of hyperplasia or degeneration that has taken place in the structure of the gland.

In the early stages of the affection Dr. Snow affirms that a complete cure is uniform. In more advanced cases the abatement of the inflammatory process and the restoration to a normal condition, relative to the degree in which organic changes have taken place, is the certain result.

Regarding the assumption, Dr. Snow takes issue with the older theory that the process of inflammation is nature's "process of repair." That, he asserts, would be true if nature could increase the flow of blood to an inflamed part in just sufficient quantity to supply the demands of repair. But, as is usually the case, when the inflammatory process is instituted we have established a local region of congestion and stasis which tends to the establishment of cell infiltration and later the development of true hyperplasia. When infection is present, however, this process is beneficent, as it walls off pus.

The indications for treatment of chronic prostatitis, in all except the malignant and infected types, consist in the relief of local stasis and the restoration of the circulation and the function of the lymphatics and other structures of the gland. The results of stripping or manual massage, and later vibratory massage and douching, in the treatment of this malady have been in a measure to relieve the condition. The failure to cure by this method of treatment, however, in many cases is due to the fact that the tissues, though relieved of tension, are rendered relaxed and not restored to their normal tension, as is the case when the static electric currents of high potential are employed.

The modus operandi of the properly applied method of treatment induces contraction of the structures of the gland, the gland itself becoming intrinsically the means of relieving itself of infiltration and the products of inflammation. Following this process the vascular tone is established throughout the gland, the fluid accumulations having been expelled. By this means the chronic process is overcome as far as possible, always de-

pending upon the degree of organic changes that have taken place, which may impair forever the performance to some extent of its active functions.

The prognosis, then, depends upon the degree of organic structural change that has taken place, prior to the institution of treatment, the character of the inflammatory process as to infection or malignancy. In aged men with dilated bladder it will require considerable time and careful management to restore tone to the relaxed and dilated organ.

The method of treatment is fraught with absolutely no danger. Dr. Snow gives preference to the static wave-current in the treatment of these cases. The patient lies upon his side and holds the insulated handle, to which is attached the electrode in his hand—firmly (but not with too much force) against the gland. It may instead be held in place by means of an X-ray tube-holder, the electrode being then held in a fixed position against the affected organ. It is generally better to educate the patient to hold the electrode in just the right position with the hand during the administration.

The treatment may also be administered in lieu of a properly constructed insulated chair, with a metallic electrode designed by Dr. Snow, upon which the patient may sit, the electrode being inclined forward in the proper position and held in place by cushions. This method is not nearly so certain as when the patient lies upon the side. The electrode thus applied is connected with the positive side of the static machine, the negative side being grounded. The length of the spark-gap will depend upon the acuteness of the case. In acute cases it is best to begin with a spark-gap of less than an inch, which if the congestion is acute or subacute, will cause considerable pain. The gap is gradually increased during each administration to the tolerance of the patient. Even in chronic cases, however, the spark-gap should not exceed four inches, and as a rule two and a half or three inches are sufficient. The plates should be made to revolve so that not more than three hundred passages at the spark-gap occur per minute. The application should be made daily for the first ten days, and in some cases should be continued daily for a longer period. From ten to fifteen minutes' application will be sufficient for the milder cases.

Metal electrodes employed in connection with the wave-current may be of varying designs according to the shape of the gland. Dr. Snow considers the straight rectal electrode the most readily adapted and practical in the great majority of cases. The electrode is passed in so that the bulbous portion lies with its convexity against the upper part of the gland, and should be held in contact between the two lobes. It is not necessary that a larger part of the gland be brought in contact with the electrode. Dr. Snow also describes two other curved rectal electrodes that may be used to meet the requirements of certain cases.

The vacuum electrode employed is the ordinary glass hemorrhoidal electrode. Other forms of vacuum electrodes are also described, although Dr. Snow affirms that it does not seem to matter what sort of electrode is used, providing the current strength is employed to produce a tonic vibratory effect.

The application of the vacuum electrode should be made direct from the static machine, the positive side being connected with the patient, the negative side being grounded. The patient in each of the methods above described should be insulated. The duration of the application should not exceed twenty minutes.

Dr. Snow reports two very interesting illustrative cases that demonstrate the value of his method, as the relief in both cases was prompt and permanent.

As the result of his experience, Dr. Snow draws the following conclusions: (1) When simple congestion is present in the early stages of the affection relief is prompt. (2) When the gland has been enlarged for a number of years with the resulting inflammatory congestion, it may be relieved with the absorption of infiltrated exudates, the hyperplastic tissue alone remaining. (3) In the aged, when the gland has become greatly enlarged and is dense and hard from the growth of hyperplastic fibroid tissue, the inflammatory process will be abated, affording a degree of relief. The dilatation of the bladder in these cases may be greatly relieved and cured in most cases by the persistent application of the electrical current over the pubes, and by an electrode carried high into the rectum and pressed forward against the bladder, together with judicious washing of the bladder and the use of strychnia.

FOREIGN NEWS AND ABSTRACTS.

EDITED BY AMÉDÉE GRANGER, M. D.

Apparatus and Technic in Radio-Therapy. By Dr. J. Belot.

Dr. Belot believes that the three generators, static machines, Ruhmkorff coils, and closed magnetic circuit transformers give equally good results providing they properly excite the tube. The results depend upon the X-rays themselves and not upon their generators, whether these be coils or static machines.

If a coil with an interrupter is used, a stronger and more regular induced current will be obtained through the tube if a Villard tube with osmo-regulator is employed in series with X-ray tube. This is a vacuum tube which has been constructed in such a manner that it opposes an insurmountable resistance to the current of closure, and an insignificant resistance to the current of break.

Within the last few months a closed magnetic circuit transformer constructed by Gaiffe has gained great popularity among the French X-ray workers. This apparatus transforms the low tension a. c. into one of high tension. Its action is smooth, safe, very regular, and its control is easy. Having no interrupter, the voltage of the current delivered from the secondary is constant and can be easily calculated.

Tube.—The tube is a very important factor in all X-ray work. The radio-therapeutist should be able at will to employ rays of different degrees of penetration, and when that degree has been obtained he should be able to maintain same during the application. As this can only be done by means of regulating tubes all other kinds should be discarded. The author recommends the tube with osmo-regulator of Villard as the most simple and efficient.

To enable tubes to produce a much larger amount of radiation during the same space of time, they have to be constructed in such a manner that they can stand those high intensities without deterioration. In some instances this is accomplished by re-enforcing the anti-cathode, in others by cooling the anti-cathode by means of various devices. The water-cooled tubes are given the preference. The author closes his consideration of the various types of localizing and cavity tubes by saying tubes for cavities will only become practical and of real merit when their focus will be near the extremity of their appendix.

Measuring Instruments.—The instruments of precision are divided into two classes: 1, those which measure the electrical capacities; 2, those which measure the nature of the rays.

Of the first class the spinthermeter, which measures the equivalent spark, is useful, but the information which it furnishes alone is very vague; the milliampere-meter for high tension currents is much more valuable and gives positive information, providing we are employing a closed circuit transformer without interrupter. In that case the tension of the current in the primary and therefore in the secondary is constant, and if we are also using an osmo-regulating tube, emitting rays of known penetrability, the mill-ammeter will furnish positive information about the quantity of X-rays produced by a given installation.

Used with a static machine or coil with interrupter it furnishes very little real information, unless we know and take into consideration all the varying factors, i. e., voltage of the primary current, number of interruptions, voltage at the secondary terminals, etc.

This has led to the more general employment of the measure of the radiations. These are of two kinds: 1, those which furnish information about the quality of the rays; 2, those which furnish information about the quantity of the rays.

The most useful apparatus to measure the degree of penetra-

tion of the rays are the spinthrometer and the radiochromometer of Benoist. The first measures in millimeters the length of the equivalent spark, which corresponds to the degree of vacuum of the tube. The last indicates the penetrability of the rays through various thicknesses of aluminum as compared with a fixed thickness of a central silver disc.

To measure the quantity of the rays the two best methods are the chromoradiometer of Holzknicht and the radiometer of Saboureaud and Noire. They both indicate the quantity of rays absorbed by the change in color which takes place in their respective reagents. The radiometer of Saboureaud and Noire has the advantage of being very much cheaper than the chromoradiometer and the scale of colors is more easily read, but it has the disadvantage that it must be placed midway between the source of the rays and the lesion.

Protection of Patient and Operator.—Means for the protection of the patient and the operator should always be employed. For this purpose tube shields and localizers have been placed on the market. The author has found cheapest and best for the protection of the unaffected parts of the patient, sheets of lead covered on both sides with rubber cloth. For his own protection he always wears an apron and gloves made of material impervious to the rays, preferably made of a tissue impregnated with a lead or protoxide of barium composition. His eyes are protected by large, thick glasses made of quartz glass.

Two very important factors more than all others influence our technic. They are the quality and quantity of the X-rays.

The X-rays are of various degrees of penetration; the less penetrating are mostly absorbed by the skin, while the very penetrating easily pass through the superficial tissues and affect the deeper structures. For affections of the skin and subcutaneous tissues there is an advantage in using rays corresponding in penetration to No. 5 to 6 Benoist. But for deeper structures, especially the deep-seated organs, we should employ rays No. 9-10 Benoist, because the more penetrating the rays the less the difference in quantity of rays absorbed by the deep structures and the integument, and therefore the less the risk of an X-ray burn. Even when employing rays of great penetration the degree of absorption diminishes rapidly as they pass from the periphery to the interior. This explains the poorer therapeutic results when treating deep-seated lesions, unless the morbid cells show a special susceptibility to the action of the rays—such as in leucemia.

The quantity of rays absorbed in the tissues or organs is the most important factor, for upon it depends the effect. The greater the quantity the more marked the effect. This will depend upon the quantity of rays emitted by the tube, the duration of the raying, and the distance of the tube from the

lesion,—it is measured approximately in H. units by the various chromoradiometers.

When treating an extensive surface it is important to have each diseased part absorb approximately the same dose of X-rays. The author suggests the following practical law, "The anti-cathode should be placed at a distance from the surface to be treated not less than double the size of its greatest dimension."

The method which he employs is:

To have absorbed in one séance the quantity necessary for a cure, if it is compatible with the integrity of the skin or mucous surfaces.

If this quantity is too great, to have absorbed at each treatment the largest quantity compatible with the relative integrity of the skin and mucous surfaces.

Allow the minimum of time necessary to preserve this integrity to elapse between the exposures.

In certain grave lesions with rapid growth, he has sometimes found it necessary to pay less attention to the integrity of the tissues than to the danger to the patient from the rapid growing neoplasm; even then a severe dermatitis should be avoided.

For instance, in the treatment of scald the necessary dose to affect a cure is 4 1-2 H. to 5 H. It should be absorbed in one séance. The same is true of pruritus, eczema, seborrhea, for the cure of which 2 to 4 H. is usually sufficient. He sees no advantage in making 5 or 6 exposures causing the absorption each time of 1-2 to 3-4 H. when the patient could be cured by one radiation.

Neoplasms that are not ulcerated require relatively higher doses for their retrogression. Here on account of their rapid growth it becomes of decided advantage to make weekly exposures, and on that account the dose has to be fractional, not exceeding 3 to 3 1-2 H. at each treatment.

Sometimes he gives 4 to 5 H., but in those cases he allows an interval of fourteen to fifteen days to elapse between the applications, instead of seven days, in order to avoid the appearance of local reaction, which would necessitate a suspension of the treatment more or less prolonged.

When the lesions are ulcerated it is sometimes preferable to cause the absorption in one séance of a large quantity of X-rays, say 10 H. Then wait twenty to thirty days before making another exposure, which should not be as intense. Certain neoplasms only begin to retrogress after the absorption of a very heavy dose of X-rays in one application.

The author affirms that the production of an X-ray burn is never necessary for the cure of a lesion by the X-rays. When this occurs it is always an accident which is sometimes unavoidable, but is never a necessity. (Read before the First International Congress of Physio-therapy, Liège, 1905.)

NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

THE NEW UNIVERSAL WALL CABINET.

The New Universal Wall Cabinet recently designed by R. V. Wagner of Chicago has some new features that will no doubt

make it one of the most popular galvanic, faradic and sinusoidal outfits yet offered the profession.

All of the parts, such as coils, meters, rheostats, interrupters, etc., are made detachable so that the outfit may be sold with only such attachments as may be required for the time being and later as occasion may require other attachments may be added so as to make the outfit complete in every detail. Thus at moderate expense not to exceed that paid for many cheap outfits the purchaser is enabled to obtain an apparatus that will never need to be thrown aside for something more complete.

Another novel feature used in connection with the wall plate is the use of a high tension induction coil for obtaining the sinusoidal current. The current is alternated through the primary of the coil by an alternator driven with a small motor so as to give any frequency of alterations desired, and the strength of the sinusoidal current, as applied, is governed in the same manner as the strength of the faradic current.

The wide range of and variation in the currents obtainable from this New Universal Wall Cabinet has not yet been duplicated by any other similar form of apparatus.

A NEW SPARK DIRECTOR.

To meet the necessity of always exactly localizing a static spark, the director shown in the cut has been designed.

The handle, 18 inches in length, is of hard rubber. From the extremity to the metal band to which the spark is applied on the handle, an insulated wire conducts the current between the band and the terminal.

Two terminals are provided which screw on at the extremity—one a ball and the other a disc, flat on one side and con-



vex on the other, for adaptation to various surfaces and conditions. By making contact with a large surface, a long spark may be applied over a sensitive area, producing effects as of the wave-current discharge.

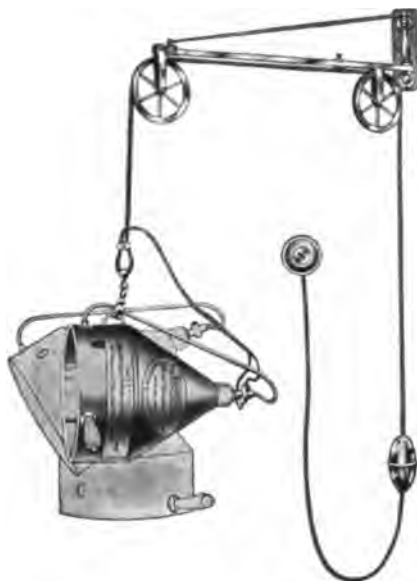
The spark effect is the same as when administered in the usual manner, and may be administered in this manner to clefts over coarse clothing and in the cavities if indicated.

The electrode is manufactured and for sale by Van Houten & Ten Broeck Co., 300 Fourth Avenue, New York.

THE "LEUCODESCENT" THERAPEUTIC LAMP WITH NEW "ADJUSTING TROLLEY."

This device makes it possible to throw the rays of the "Leucodescent" Lamp in any desired direction by tilting the hood at any angle from vertical to horizontal, and fixing it there by a thumb-screw on a curved trolley.

The utility of this improvement will be apparent at once, in the treatment of the orifices of the body.



It is of great convenience, also, in applying the light externally while the patient is partly nude (trunk, for example) and sitting upon a chair.

It insures a steadier radiance than can be obtained by holding the hood with the hand, which becomes tiresome if many cases are to be treated in succession.

The Leucodescent Therapeutic Lamp is a high-power incandescent lamp (300, 400, 500 c. p.) and has been approved as a most valuable addition to the equipment of the progressive, advanced therapist, by some of the most conservative, practical men in the profession.

It is made by the Spear-Marshall Company, Republic Building, Chicago, and is on sale at the salesrooms of Van Houten & Ten Broeck Co., New York; Swett & Lewis Co., Boston; A. J. McKee & Co., Washington.

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CONSERVATIVE GYNECOLOGY—ITS RELATION TO THE CONTINUOUS CURRENT.

BY MARGARET A. CLEAVES, M. D., NEW YORK.

By conservative gynecology must be understood any measure or measures which will tend to a restoration of the pelvic organs of women to normal functional activity, if not normal anatomical conditions. The two are not necessarily the same. A malposed uterus need not be a barrier to pelvic health and function, nor does a uterine fibroid always menace health and demand a surgical operation. Curettement for sterility is begging the question, for the uterine mucosa and the pelvic organs in general which are the subject of perverted nutritional conditions do not demand a destructive measure to restore them to healthful function. On the contrary, such an expenditure of energy as will tend to the production of nutritive changes without such destructive action is indicated. A gonorrheal vaginitis to be successfully combated requires a gentle expenditure of energy. Strong silver solutions, for example, are contraindicated. Gonorrheal pyosalpinx does not in all cases call for removal of infected tubes. The prolapsed vaginal walls forming cystocele and rectocele with or without perineal injury are not beyond our help. In the aged, operation is apt to be refused and, even so, is not always advisable. The retrodisplacements, the anterior flexions, modifications of the position of the normal uterine organ, are by no means beyond assistance. Uterine prolapse does not always require surgical interference. A degree of prolapse can be overcome, the symptoms relieved and the patient's life made more than tolerable. Pelvic exudates can be made to disappear almost like magic and even when fibrous bands exist which cannot be absorbed, the improved circulatory changes established result in disappearance or modification of the symptomatic evidence of the trouble.

* Read before the Fifteenth Annual Meeting of the American Electro-Therapeutic Association at New York, September 20, 1905.

To hang a uterus up in midair, so to speak, as in a ventro-fixation, depriving the organ of all its normal elasticity until it becomes chronically enlarged, and hangs suspended in the pelvic cavity like an inflated balloon, no matter how successful the operation, does not restore pelvic and general health—on the contrary.

Since the time of Apostoli the value of the continuous current in conservative gynecology has been recognized, and to the members of this Association the principles laid down by him need no repetition. In the hands of the especially skilled, good work even in grave pelvic cases has been and is done. But unfortunately, no matter whether skillfully used or not, this method possesses untoward features on account of the danger of exciting inflammatory conditions, pre-existing, with their unfortunate sequelæ of exudates and adhesions. The gynecological surgeon not infrequently has the care of these cases later on, and if called upon to operate, he finds his work complicated by the presence of adhesions for which the electrical treatment receives the blame. This is not necessary, nor does it occur as frequently as formerly; still, a surgeon reported a case to me within the last few weeks. No matter what work is to be done, what obstacle is to be overcome, there is no need of using a sledge-hammer blow when the flutter of a butterfly's wing or the tap of a feather, so to speak, will suffice. There are methods of using the continuous current in the class of conditions enumerated as well as others, which are as yet too little appreciated. The work of my fellow-founder member of this Association, Dr. G. Betton Massey, has made the use of mercury at the anode with massive doses of current classic, and to him belongs the greatest credit for his continued and persistent efforts in the cataphoric sterilization of cancer. For my own part, in every suitable case I believe the preference is to be given to Dr. Massey's method in this class of cases over and above the X-ray.

My fellow-member, Dr. W. J. Herdman, admirably showed in his paper two years ago the beneficent action of anodal electrolysis in an osteosarcoma of the superior maxillary bone involving the whole of the jaw and alveolar arch on the right side, extending upwards so as to encroach upon the antrum, and inward to the median line of the jaw so as to displace the tongue to the left side, and back part of the oral cavity.

In both these instances the applications were characterized by great current density.

The action of the current upon oxidizable electrodes at the anode with mild doses in the treatment of endometritis, of fibroids, of pyosalpinx and of gonorrheal vaginitis is to be preferred in every instance to the simple polar action of the current. With the latter, no matter whether cathodal or anodal, there is a destructive action, at the cathode by reason of chemical action and at the anode by coagulation, resulting in the production of scar tissue. With mild currents this scar tissue is slight, but it exists. Not so from the action of oxidizable electrodes at the anode and the transfer of the ions of a given metal, copper, silver, zinc, zinc-mercury amalgam, as the case may be. The best interests of the patient are conserved always by avoiding the production of scar tissue, which with its imperfect circulation readily becomes a nidus for morbid conditions.

Twelve years ago it was my pleasure to present this subject to the members of this Association. In all these years this method has been my main reliance, where an invasion of the uterine cavity became necessary by reason of the existing pathology. Experience has taught me that the maximum dose of 30 milliamperes advised by Gautier as the result of his experiments, need never be exceeded in non-malignant conditions, while 20 milliamperes is oftener used. By this method the nascent ions of copper, silver, zinc, and mercury, are transferred deep into the uterine mucosa or that of the urethra, as the case may be, and the action is much more energetic and profound than can be obtained either by the polar action of the current, or by the topical application of medicaments. Experience in connection with experimental work has also taught me that too frequent repetition, even as often as the period of eight days established by Gautier, for the work of congestion, elimination and repair, does more harm than good. Experiments made upon living animals, frogs and guinea pigs, in the muscular structure of the former and the genital mucous membrane of the latter, showed extreme dilatation of the blood vessels and imperfect repair of the mucous membrane even after ten days. Two intrauterine applications in a bleeding fibroid or endometritis or a uterine hyperplasia during a menstrual cycle, can rarely be made. One is productive of greater good and should be made the middle of the menstrual month.

Careful technique is essential. The electrode, whatever the metal, should be given a fresh surface for oxidation and then made surgically clean by immersion in boiling water or suitable antiseptic. That the method is itself strictly antiseptic, germicidal in fact, is no reason for the neglect of strict antiseptic precautions. The position of the uterus and direction of the canal having been determined, the electrode may be introduced either through a bivalve speculum or along the finger. When the direction is known, I prefer the use of the speculum, as then none of the vaginal discharges are carried into the uterus. The introduction of the intrauterine electrode in the class of conditions enumerated is in my hands accomplished, ninety-nine times in a hundred, without giving pain. Pain is to be avoided. It means too great or an unskilled expenditure of mechanical energy in the one instance, or, when the current is turned on, of electrical energy. In gonorrheal pyosalpinx a painless application is impossible. Applications are from five to fifteen minutes in length. If copper or silver has been used, the electrode is tightly adherent to the uterine mucosa, and after turning the current gradually off, the poles are reversed in order to release it. Theoretically with the same dose, one-third of the time required for the application will be necessary to release the electrode, as the hydrogen ions travel with much greater velocity than the oxygen or metallic ions. In practice this is not far from the truth. Reversal is apt to be accompanied in most cases by a little pain at first which is severe in cases of pyosalpinx. An application of the fast interruption of the induced current, unless contraindicated, usually relieves any discomfort felt. This discomfort may in tubal cases be a pain with soreness and sensitiveness, or in others it may simply be a feeling of trembling or exhaustion, felt especially throughout the pelvic and abdominal regions. On the other hand there are many patients who immediately following such a treatment as well as subsequently experience a sense of well-being which does not leave them. With zinc, or zinc-mercury amalgam at the anode there is no adherence of the tissues and therefore reversal is not necessary. I am in the habit of selecting my metal according to the pathologic conditions and use each and all with equal frequency. Rest in the recumbent position is always insisted upon afterwards from one-half to one hour according to the gravity of the case.

No matter what the condition, whether there is a simple endometritis, a fungoid endometritis, a bleeding fibroid, or a pyosalpinx, the cavity of the uterus is never invaded, until the patient's tolerance has been fully established by applications of the current, characterized by current distribution and not then if these suffice.

Such are the methods which I described at the meeting of this Association eleven years ago as special hydro-electric applications and which have been in daily use ever since. In gynecological practice the vaginal hydro-electric applications of the continuous current are depended upon at first in every case. In the majority of cases this gentle and absolutely painless expenditure of energy suffices, and the uterine cavity is not entered. Where it is desirable to utilize the action of the ions of silver, copper, zinc, or mercury, silver and copper wires replace the platinum wire of the vaginal water electrode, or the salts of the metals mentioned are placed in solution and the ions of the fluid electrolyte are transferred directly into the vaginal mucous membrane and all the pelvic tissues. When indicated, iodide of potassium and iodine are also used. Better results are to be obtained than by simply placing a metal electrode within the vagina, for by means of the fluid electrolyte of from 3 to 4 quarts the vagina is distended and every interstice folded out, so that not only is there a complete lavage, but the action of the current alone, or the current supplemented by the ions of silver, copper, or mercury, is brought to bear upon the minutest fraction of the vaginal mucous membrane, the vaginal vault, the cervix uteri, and indirectly upon the uterine body and adnexæ. It is current distribution in the highest sense. The vaginal electrode is so constructed that the obturator closes the vagina until it is fully distended. The advantage of this method in pelvic exudates, either from the use of the cathode or by the diffusion of suitable drugs cataphorically, is self-evident, while its use in vaginitis, simple or specific, is beyond question. In gonorrheal vaginitis a silver or copper wire or sound is always placed in the electrode, and the fluid electrolyte, saturated as it is with the ions of one or the other comes in contact with every part of the diseased mucous membrane and is carried in as well by the cataphoric property of the current into the deeper structures where the germ resides. There is no danger of carrying the infection deeper into the

structures, the fear of all gynecologists and genito-urinary specialists in this class of cases as the method is germicidal. From 1 to 20 milliamperes is used according to the character of the case. The lesser dose is used in the beginning and gradually increased at subsequent sittings. The usual dietary and hygienic measures are always looked after. Naturally the best results are attained in these cases where the sexual relations are controlled, but despite their continuance satisfactory results have been obtained.

In the treatment of pelvic exudates, chronic para- and perimetritis, fibroids, and ovaritis, the dose may be from 5 to 50 milliamperes.

The profound effect of this gentle, well-distributed, and painless expenditure of energy is illustrated by the following cases: A patient suffering from a bleeding fibroid, almost bloodless in appearance, had been curetted twice, once by the late Dr. Goodell of Philadelphia; spent three weeks out of the four in bed, underwent treatment by vaginal hydro-electric applications, anodal, of the continuous current. Treatment was begun from ten days to two weeks after menstruation. The menorrhagia was controlled. This patient was so worn and exhausted as to require the gentlest handling. Therefore, an application characterized by current distribution with its profound influence upon the pelvic circulation was chosen. At a suitable period after menstruation intrauterine applications, anodal, with a silver electrode were made at intervals of eight to ten days. The patient continued to improve, as evidenced by better nerve tone, increased strength, color, better spirits, disappearance of symptoms, and normal functions. She returned home after a little over two months. Was she cured of her fibroid? No, but the distressing symptoms of pain and pressure and the hemorrhage were controlled with improvement in the general health.

A similar case, treated in the spring of 1905, was waxen and anemic from excessive prolonged and continuous hemorrhages. She came to me after having seen a surgeon who said an operation was imperative. Her face was waxen, and she was weak and breathless with disturbed heart action from her anemia. The entire uterus was involved. The growth, an intramural, rose well up out of the pelvis to within two inches of the umbilicus. Pain and pressure symptoms existed and sensitiveness over the organ and adjacent parts. Here again,

on account of the nerve-worn condition and exhaustion of the patient vaginal hydro-electric applications of the continuous current, anodal, were used, at first with the result of arresting hemorrhage, relieving pain and pressure symptoms and improving the patient's general health. After the menstrual period, intrauterine silver applications were made, twice in one month with increased gain in every way; the next month one in the middle of the month, but the vaginal hydro-electric treatments were given during the intermenstrual period between times in order to keep up good circulatory conditions. This patient is now after less than three months' treatment in rude health. The growth is smaller with better definition and is giving no signs of trouble.

When it is remembered that electrolysis chemically and cataphoresis mechanically alter the amount and distribution of salts necessary to the proper nutrition and function of the various parts of the living organism, these results are clearly explained. By the latter there is a direct transference of the fluids and salts by way of the cell walls, muscle septa, coats of blood vessels, sheaths of nerves, skin, serous and mucous membranes, in fact all animal membranes which from the physical point of view are all the very best kind of porous diaphragms. Primarily this action takes place throughout the tissues interposed between the electrodes, not necessarily the nearest way, but along the path of best conduction, but secondarily its influence is felt beyond the interpolar region. Just as it is impossible for a local hemorrhage to exist without its influence being felt beyond the immediate site of the hemorrhage, just so it is impossible to drain a part cataphorically without its influence extending even to the entire organism.

This physical effect may be carried to the extent of completely cutting off the blood supply, thereby causing immediate and actual destruction (electrolysis of a mole); or by interfering with it to such an extent that there is no channel left by which the inorganic constituents and proteid nutriment can be conveyed to the part with which to feed it, and death from starvation ensues (absorption of an organized inflammatory exudate or an intramural uterine fibroid); or in lesser degree, only by the normal ionization and osmotic action characteristic of living tissue and necessary to nutrition and normal function. In this latter instance the same physical effects of the current result in

a stimulation of normal chemico-physiological processes, i. e., the movement from ion to ion throughout the inter-polar circuit, the bodily transfer of complete neutral molecules and the normal non-electric osmosis. By this action nutritive changes are initiated and, by a sufficiently frequent repetition of the use of the current are subsequently fully established. The one condition or the other will obtain according to the quantity of the current and the manner of its use, that is, whether a strong or a mild current is used and whether the application is characterized by current distribution or current density. The use of a strong current of short duration, characterized by current density, has either an intense irritant or else a destructive action, whereas the same current, if characterized by current distribution, will produce an entirely different effect because by reason of the increased electrode contact—square inch area—the energy expended in each square inch of surface is diminished in proportion to that increase.

A mild current, if long continued, will cause a profound change in the amount of fluids and salts in a part, and in this physical fact is to be found the therapeutic indication in pathological states, whether characterized by a diminished blood supply or under nutritive activity, pelvic exudates or a benign degenerative process, or by an excess of fluids, as in a subacute articular rheumatism for example. The nutrition and healthful function of the living organism as a whole, as well as a part, is absolutely dependent upon the maintenance of the normal proportion of the fluids and salts. It follows, therefore, that the removal of the fluids and salts from a part, a fibroid, for example, by the action of the current, even though the removal be but temporary, will tend to the death of the tissue thus acted upon. Morbid growths and all suborganized material are less well provided with blood vessels than normal tissue, and such an action will tend to interfere with the circulation, with the result of depriving the part of its proteid nutriment, or in other words, starving the outgrowth or exudate.

M. R., widow, aged fifty-nine years, domestic duties. From a constantly recurring low-grade inflammatory action exudative masses had been thrown out, complicating a retro-displacement of the uterine organ and pressing upon a prolapsed and enlarged ovary. The general health was bad in the extreme.

Anemic, worn and anxious facies, heart normal. Uterus retroverted, held back by exudates, right ovary prolapsed, enlarged and sensitive, vaginal mucous membrane red and congested. Twenty-eight continuous current hydro-electric applications were given, resulting in nutritional gain, i. e., increased weight, improved color, better circulation, ability to sleep, lessening of nerve irritability and depression, with improved digestion. Less pain and congestion, right ovary smaller, less sensitive, less markedly prolapsed, absorption of exudates. An intolerable existence made tolerable without restoring organs to correct anatomical position or to physiological condition.

Mrs. —, aged forty years. Had a severe inflammation involving all the pelvic tissues. She came under the writer's care in 1893 after several years of invalidism, during which time she was bedridden for at least three weeks out of four. She drifted from one gynecologist to another, and there was no lack of talent in the coterie of brilliant men she enumerated. Every physical examination, according to the history given, produced an exacerbation of her trouble. She had constant pain in the pelvis, leucorrhea, dragging and weariness of limbs, backache, disturbed digestive functions, dysmenorrhea, and every month or two an attack of inflammation which kept her in bed and tied to hot douches, applications, etc. Forewarned was forearmed, and in examining the patient the greatest care and gentleness were used. Although discomfort followed, there was no inflammatory exacerbation. The pelvis was found literally roofed in, the uterine organ immobile, and the ovaries bound down in the exudative mass. So great was the encroachment upon the cavity that the vaginal electrode could only be introduced from one-third to one-half its usual length. The greatest care was exercised to prevent either mechanical pressure or too great current density at the vaginal vault. The task demanded all the skill and experience possessed in this class of work as well as the most exact technique and knowledge of the properties, physical and physiological action of the energy used, for if a fraction of unit more of electrical energy should have been expended than was indicated, or a unit more of manual energy used in the necessary manipulation than the sensitive tissues could bear, the trouble would undoubtedly have been exaggerated. The two or three months the patient was under care were months of constant anxiety; but by gentle,

patient, and persistent effort the desired result was obtained and absorption established with modification of all her symptoms and relief from some. The vaginal space was much less encroached upon and the pelvic organs became mobile. Treatment was given in the early fall of 1893, and the summer following the patient made the trip to the Yellowstone region as well as touring through the Pacific Coast region without any return of her trouble. She was heard from only two years ago, and has remained well.

Mrs. C., aged thirty-three years, September 7, 1894. Intra-mural fibroid developed in right and anterior walls of uterus; ovaritis, right; exudates, right side; uterus immobile; canal tortuous; pelvic pain, soreness, sensitiveness to pressure, especially right iliac fossa; cruralgia (pressure); constipation; profuse and premature menstruation. Twenty continuous current treatments, vaginal hydro-electric, were given, extending over a period of four and a half months. Result, complete relief of all symptoms, disappearance of exudates, return of uterine mobility, regular bowels, regular and normal menstruation, relief of crural pain, and establishment of general health. Fibroid mass firmer, harder, and better defined. Slight diminution in size, due in part to the better definition of the mass and complete cessation of symptomatic evidences of disease. Treatment was suspended January 24, 1895, and a few months later the patient who had been sterile for seven years, became pregnant, passed through a normal pregnancy, and in the spring of 1896 gave birth to a well-developed child. There was no trouble at confinement, and the patient has remained absolutely well for ten years. The position of the uterus was such by reason of the growth that at no time could I introduce an intrauterine electrode. The result was obtained by vaginal hydro-electric applications. Last year she came to New York to live, and in the overwork of putting her house in order, she had her menorrhagia again and also severe ovarian and crural pain (pressure) with marked anemia. After an examination I told her that I could again make her all right, upon which she exclaimed: "But I do not want another baby"—at forty-two. She is now in perfect health.

As to sterility, it has been my happy experience to overcome this condition in retro-displacements, when complicated by fibroids, endometritis, a relaxed and atonic condition of all the pelvic organs, and in no instance have other methods than those indicated been used, and always with mild currents. Since I began the use of the oxidizable electrodes at the anode and vaginal hydro-electric applications, I have never curetted, nor had a patient curetted, although that was my former custom.

Mrs. T., æt. thirty-five, came under my care last spring.

She was sterile from marriage, became pregnant after two months' treatment. Prior to the vaginal hydro-electric applications there was complete relaxation and atonic condition of all pelvic structures with slight catarrhal endometritis.

In a case of chronic gonorrheal vaginitis, urethritis, and cystitis of some two years' standing, presenting classic symptoms, characteristic creamy discharge, enlargement of vulvo-vaginal glands, frequent and scalding micturition, with exacerbations, treated by classic methods at the hands of one of the city's foremost gynecologists without relief, symptomatic relief was at once established and also physical conditions changed. The ions of silver by the action of the current upon the silver conducting wire in the vaginal hydro-electric electrode were set free, and diffused through the water forming the electrolyte. They were thus brought into contact with every part of the diseased mucous membrane, vaginal, urethral, and vesical. The patient made a complete recovery; she was under care three months. The subsequent season she suffered a relapse—her husband was under the care of a genito-urinary specialist—but the same method quickly overcame the difficulty. In other cases Cu So_4 has been added to the water and platinum wire used at the anode with immediate and satisfactory results. Mercury was also used in solution at the anode with prompt and complete recovery in an acute case. There is offered by the cataphoric transfer of the ions of these different metals deep into the tissues an immediate and energetic germicide. In no case has there ever been any untoward reaction.

In a case of gonorrheal pyosalpinx referred by the genito-urinary specialist who had charge of the husband, curettement had been advised, but patient was unwilling. Pain, severe and colicky in character with burning sensation, intermittent flow of muco-purulent discharge, greenish in color, menorrhagia and metrorrhagia present, sterile; loss of flesh, very nervous, fever. The left tube was actively involved and was tender, thickened, enlarged and at times much distended. Pressure on tubal region caused purulent discharge at os uteri. The right tube was but little involved. Ostium internum permeable. In this case vaginal hydro-electric applications were made twice a week and at suitable intervals, once in eight to ten days, an intrauterine application with copper electrode was made with 10 to 20 milliamperes of current for ten minutes. Medicated tampons were used part of the time to maintain pressure over the diseased tube. After three months the patient was relieved of all her symptoms subjective and objective. The following season there was a relapse. Treatment was again followed by the same relief, and for the past five years this patient has remained well.

A woman, æt. thirty-nine, with a multiple fibroid, suffered from menorrhagia and metrorrhagia and the characteristic

pressure symptoms. She was emaciated and anemic with worn and anxious facies. There was a small growth in the cervix, another subperitoneal developed laterally to the right, as large as a fetal head, while an intramural growth in the posterior wall filled the recto-vaginal space. The canal was so tortuous as not to admit of the passage of an intrauterine electrode. Treatment consisted of vaginal hydro-electric continuous applications. From their use improvement was established and the general health much improved, but the distressing symptoms still remained in evidence.

There was no indication of an approaching menopause, nor was it to be expected from her years. In October of 1897 I made a series of three cupric punctures to the growth in the cervix, anodal, with a current of 10 milliamperes to each puncture. The indifferent electrode was placed upon the abdomen. The needle was carried in to the depth of from one-fourth to one-half an inch and the entire séance lasted but ten minutes. The deposition of the ions of copper into the cervical growth was very prettily shown by the characteristic copper green coloring. Examination three months later disclosed the cervix absolutely free from fibroid and perfectly normal in every particular and mucous membranes sound and without blemish. Not the slightest trace of the puncture could be found. In the following April I made a series of from four to six cupric punctures, anodal, in the most dependent position of the posterior growth, using from 5 to 10 milliamperes of current for from five to ten minutes for each puncture. The needle was carried in to the depth of from one-fourth to one-half an inch in each instance. After her May period (at suitable time) another series of punctures were made, 20 milliamperes, five minutes each. Reversal of current in every instance to release the needle. Great care taken that the needle should be within the growth, in order that the energy be not expended upon the vaginal mucous membrane. Menstruation was in abeyance until September, 1898, when she had a normal period. Her general health improved, the subperitoneal growth diminished in size, the recto-vaginal space increased, and there was no return of the menstrual function save in September, 1899. This patient was seen by me every week during this time and for several years afterwards. She remained well and when last seen (1902) the subperitoneal growth was not bigger than a hen's egg, while the posterior growth was markedly smaller and the bowel function normal. The question arises as to whether the menopause was not ready to be established. I do not know. There were no indications and the result obtained seemed to bear a close relation to the work done.

EXPERIENCES WITH RADIUM IN DISEASES OF THE THROAT AND NOSE.

BY W. FREUDENTHAL, M. D., NEW YORK CITY.

So little has been written on the use of radium in diseases of the throat and nose that I ask your indulgence in again bringing up this subject. Although the effect of the emanations of radium is still a matter of speculation, it is nevertheless so remarkable as to be of interest to everyone. Aside from this, the possibility by this means of successfully attacking malignant affections is to us as physicians the greatest stimulus.

Just a year ago I published a short report on radium, of which you will permit me to quote a part.

CASE I.—Mrs. Y., aged thirty-seven, was referred to me by her family physician on account of tuberculosis of the larynx. She gave the following anamnesis: She had been attacked with influenza a year ago; cough set in immediately and her physician very soon found the left lung affected with tuberculosis. About three months ago hoarseness developed and a tickling in the throat that annoyed her greatly. Occasionally there was pain in swallowing. During the last month her temperature (in the rectum) varied between 99° and 102.2° F.

Status præsens, May 3, 1904. Marked post-nasal catarrh and granular pharyngitis. In the larynx the right vocal cord is excavated at the end of its anterior third due to a deep ulceration that is partially cicatrized. The other portions of this vocal cord are retracted and slightly infiltrated. The left vocal cord shows irregular edges and is also retracted. The arytenoids are a little edematous in appearance and the interarytenoid space presents small excrescences like stalactites. Patient is aphonic and can talk only in a whisper. The left lung is affected in its entirety with a big cavity in the upper lobe, as is also the upper and middle lobe of the right lung.

As I wanted to study the physiological effect of radium on the mucous membrane, I thought this a good case and applied it directly to the larynx. A small glass tube containing 0.25 gm. radium of 20,000 strength was put into a receptacle recom-

* Read before the Fifteenth Annual Meeting of the American Electro-Therapeutic Association at New York, September 20, 1905.

mended by my friend, Dr. Max Einhorn, of this city, and the whole screwed on to a strong probe. A sterilization of all the parts could easily be done. The probe was bent so as to conform to the shape of the larynx and inserted after thorough cocainization. The patient took the probe between her teeth, while an assistant supported its end. She afterward learned to hold the probe alone, so that an assistant was not necessary. The first time after the introduction of the bucket, patient could hold it only for one minute, being somewhat excited over the new procedure. Right after she tolerated it for eleven minutes and after a short interval for another ten minutes, so that radium had been applied at the first sitting altogether for twenty-two minutes. After leaving my office she felt somewhat dizzy and drowsy, but she suggested that this might be due to the cocain.

She was then treated until June 1, 1904, when she went to Liberty, N. Y.

Remarkable were the granulations (infiltrations) springing up from different parts of the larynx, thus diminishing its lumen materially. For that reason we were compelled twice on account of slight dyspnea to interrupt the treatment. A day sufficed to restore these parts and widen the glottis. The granulations that sprang up so quickly after a few exposures are analogous in one respect to the changes produced by injection of the old tuberculine. All those who remember the first injections of Koch's old tuberculine at the end of 1890 and early in 1891, when large doses were given, will perhaps also recall the occurrence of large granulations arising in the larynx in cases complicated with tuberculosis of that organ. I recollect one of my cases in which tracheotomy had to be performed on account of dyspnea due to this cause.

Our patient died, as I hear now, about six months later from pulmonary tuberculosis. She had during that time little trouble with her throat.

Since the publication of this case I have used radium bromide (10 milligr.) of one million radio-activity contained in a small aluminum tube, as sold by Lieber & Co., of this city. It occurs to me that these tubes have an advantage over the glass bottles formerly in use, since such thin sheets of aluminum allow quite a proportion of the alpha rays to pass through. These

rays are, as we know, therapeutically of great value. Furthermore, the greater radio-activity of the radium now employed by me made it possible to apply it successfully in those cases which formerly could not tolerate the tube in their throats for sufficient time to derive any benefit. Some patients gag very easily, and this unpleasant occurrence I encountered even in some consumptives who generally tolerate applications to the larynx without trouble. For that reason I was compelled to give up radium treatment in several cases.

Ten cases of tuberculosis of the larynx were treated by me, and the results achieved were gratifying in a certain number. Radium in this disease does more than any other remedy at our disposal. It is known to you all that such lesions (ulcerations) have been cured by lactic acid, by other astringents, by electric light, Roentgen rays, etc. But as a rule these ulcers were not deep-seated. With radium, on the contrary, two cases of deep ulcerations in the larynx have been caused to cicatrize completely. Three other cases which seemed much like the foregoing showed no improvement at all under the use of radium. Of the other five cases which presented only initial stages of tuberculosis of the larynx, two were cured, two left treatment too soon to permit me to judge of the result, and one became worse.

Now, it is true that a cure in tuberculosis depends upon a good many things, especially on the condition of the stomach and of the heart. Perhaps these ten cases of mine, all of them private patients, were exceptionally favorable ones; but in spite of this it must not be forgotten that two cures in advanced cases out of a total number of ten is more than could formerly be achieved. These two patients are now, i. e., ten months after the treatment, in perfect health, both in regard to their laryngeal and to their pulmonary condition.

For obvious reasons radium could not be used in sanatorium or dispensary practice, or else my experience in tuberculosis would have been much larger.

The next class of cases to be discussed are the malignant tumors. On the border line of these is perhaps a case of rodent ulcer. As these latter cases are infrequent in my practice, I can only report this single observation.

Mr. N. S., forty-eight years old, merchant, had been suffer-

ing for a little over five years from an ugly-looking sore on his face. It had been treated by different physicians, but without relief. Examination showed a rodent ulcer which affected the right ala nasi and extended over the cheek a distance of about one inch. This patient had been referred to me by a colleague for radium treatment, and I commenced with this at once. The radium was held by means of my usual probe within a distance of about an inch from the ulcer for ten minutes the first day. An application of a five per cent. ichthyol ointment was ordered to be made at night, which was washed off in the morning, when the ulcer was again exposed to radium for twenty minutes. The next day, February 1, 1905, there was some reaction, so that the radium was not applied. Ichthyol was continued as before. February 2, radium used for fifteen minutes, as reaction had somewhat subsided. In this manner the patient was treated every second day. By February 28 marked improvement was already noticeable. The ulcer had diminished visibly, and the patient felt happier than he had for a long time. He was seen from now on only every third day, his condition improving steadily. March 28 he had to leave on an extended business trip, when the ulcer had shrunk so much that its largest diameter in one direction was about 6 mm., while in the other it measured only 4 mm. I have not heard from him since, but consider the result so far a very good one.

The question, what can be accomplished with radium in malignant tumors? is perhaps of foremost interest. It has been demonstrated by Cleaves and others that cases of sarcoma can be cured by radium; but how about epitheliomata? Permit me to relate the histories of three cases as representatives of a certain class.

J. J., a tailor, sixty years of age, consulted me in the fall of 1904. His trouble commenced a year previously with toothache. Not being in a position to spare the time he did not consult a dentist until six months later, when the pain had become quite severe and a swelling appeared in the throat. He was told at that time that he had a malignant tumor. When I saw him first the right tonsil was greatly swollen, and three large segments could be distinguished. This swelling extended some distance to the inferior maxilla. At the same time he had an ankylosis of the right arm with swelling in the elbow joint.

The whole process seemed to indicate a syphilitic origin, and he was given salicylates and iodide of potash. The elbow joint improved quickly, and has not bothered him since. The tumor of the tonsil very soon proved to be an epithelioma. All operative intervention being refused, radium was tried. The effect was remarkable. The tumor commenced to increase rapidly in size, and after a few sittings broke down, and a large mass of pus was evacuated. The patient experienced great relief, but this did not last very long. The mass soon spread over the inferior maxilla, attacked the cheek, and metastases were also noticed in the lungs and in the bladder. Finally the tongue became infiltrated, and chewing and swallowing were more difficult than before. It was one of the worst cases of the kind I have ever seen. He kept the whole house staff busy, and could not get enough medicine. At last he died in March, 1905, after terrible suffering. Result of radium treatment, nil.

S. G., aged sixty, has been hoarse for the last five months, and has been treated by a specialist for his throat, who referred him to me. On April 17, 1905, when I first saw him he complained of hoarseness and pain in swallowing, the apparent loss in flesh not causing him any anxiety. A polypus had been removed from the nose some time ago. In the larynx there was a diffuse swelling of the left vocal cord, more pronounced in its posterior third and extending somewhat to the arytenoid and ventricular band of the same side. It was shown microscopically that this tumor was a carcinoma of the larynx. On April 17 we began with radium, which was applied for five minutes. April 24 same treatment. On April 25 the radium was omitted as signs of marked edema and venous stasis of the uvula were noticed, which may be explained perhaps as follows: The patient being rather unruly, I intended first to accustom him to this manipulation, and did not insert the tube into the larynx as far down as was indicated. April 2, the uvula appears more natural, and the patient says he has less pain and can swallow easier; radium used again, and also on the 27th, 28th, and 29th, during which time the venous hyperemia had disappeared. On May 1st an ulceration on the left side of the uvula was plainly visible and more pronounced the following day. Radium, of course, was omitted again; more marked dysphagia. May 3, ulcer is much better; swell-

ing in larynx greater, more so towards the anterior angle, and also affecting now the right vocal cord. May 5, 6 and 7, ray-ing with radium, May 8, swelling in the larynx increasing; dyspnea setting in. This became so intense that on June 10 we sent him to the Mount Sinai Hospital, where Dr. A. V. Moschcowitz took charge of the case. The doctor's short report is added:

"S. G., sixty years of age, a tailor by occupation, and a native of Russia, was admitted to Mount Sinai Hospital June 12, 1905.

"Diagnosis: Malignant Growth of Larynx.—June 19. Complete laryngectomy. Anesthetic 1-4 per cent. cocain hypodermatically; esophageal opening sutured with a double row of catgut sutures. Stump of trachea sutured with silk in lower angle of incision.

"Specimen showed an infiltrating growth of the true vocal cords. Growth was bilateral and more marked on the left side. The left cord had entirely disappeared and the right was to a large extent replaced by it. At the upper level of the larynx there were two funnel-shaped depressions communicating with the interior of the ventricle of Morgagni, and which were lined by mucous membrane. Pronounced by Dr. M. to be congenital failures of proper closure of the bronchial arches.

"Microscopical Diagnosis: Epithelial Carcinoma.—June 23. First dressing.

"June 28. Some leakage through esophageal wound. Patient has taken some nourishment by mouth, but is fed mostly per rectum.

"July 3. Most of the esophageal suture line has broken down; hence patient is fed by gavage, the tube being introduced through wound in neck.

"July 24. For feeding purposes the tube is now passed through the mouth. Patient in excellent condition.

"July 29. Patient swallowed a raw egg without discomfort. Wound contracting very much. Thereafter suitable food was being swallowed readily and gavage was gradually discontinued.

"August 12. Discharged with a very small esophageal fistula, which causes no annoyance.

"Thereafter patient presented himself from time to time, always in excellent condition, and has no trouble whatever from

the minute fistula, for which reason its closure is deferred. Has regained his weight, and weighs more than ever before."

I have seen the patient on and off, and it is apparent that he is much better since total laryngectomy has been performed.

In this case radium has undoubtedly not done any good whatsoever as far as retarding the growth of the tumor; perhaps, on the contrary, the opposite effect may be due to its emanations. At the time the edema of the uvula first appeared, it is likely that the whole organ was in a devitalized condition, so that an ulceration developed. But as in former cases, I must say that such ulcers are of no serious consequence, healing rapidly as soon as radium is left out.

Mrs. A. W., sixty-three years of age. Father died at the age of sixty-five and mother at eighty-five. She has been well up to five months ago, when difficulty in swallowing set in. This became worse until, when I was called in, even liquids could be taken only with the greatest difficulty. It was evident to everyone that under such circumstances her death was only a question of a few weeks.

Status præsens: June 14, 1905. A large tumor is found on the right side of the neck, extending quite a good way back. The interior of the larynx presents a paralysis of the right vocal cord and an infiltration of the posterior wall of the larynx. Undoubtedly the upper portion of the esophagus is affected. The case is evidently one of malignant disease of the neck, affecting also the esophagus and larynx.

Although in a case like this there was absolutely no hope of a cure, we desired to give the patient the benefit of radium treatment, and began immediately. This treatment was continued for me by Dr. A. G. Pohly, who noticed that after two exposures the patient could swallow easier. The voice gradually became stronger and hoarseness finally disappeared. July 5, the patient could swallow solids and felt better. July 15 she complained of pain on the left side, and on inspection Dr. Pohly found small ulcers, probably due to the continued use of radium. It was therefore discontinued, and the ulcers as well as the pain disappeared in a few days. After that, however, she began to grow worse; fever set in, and she discontinued treatment.

In this case there is one point of importance, viz., the greatly

improved facility of taking food. Before treatment with radium this woman had swallowed fluids only with the greatest difficulty, but after its use she could take even solid food. Many such cases were first observed by Dr. M. Einhorn (Journal of American Medical Association, July 1, 1905) with generally good results in regard to deglutition. I am glad to be able to agree with him thoroughly. This fact may, perhaps, be explained as due to a softening of the tissues. It has been repeatedly noticed that a softening or sometimes more or less pronounced edema develops soon after these exposures. This as well as the breaking down of tissues, in my judgment, explains the real and imaginary widening of formerly impassable strictures. This, however, is the only benefit derived in malignant tumors.

Permit me to add to these cases one belonging entirely to another category, but also of interest, viz., a case of ozena.

Mr. R. V. C., of Costa Rica, has been troubled with "catarrh" for which he has been treated in his native country as well as in several cities of the U. S. He is especially annoyed by the bad odor from his nose and the masses of crusts that fall down into his throat. Frequently there is nosebleed. Diagnosis: Ozena on both sides. Pronounced atrophy of the entire mucous membrane lining the interior of the nose, and nostrils filled with scabs, but apparently no affection of the accessory sinuses. The latter was immaterial, since this extremely timid gentleman would not submit to any operative procedures, not even puncture of the maxillary sinuses. After trying the ordinary cleansing solutions with the usual results, radium was applied intranasally.* In the beginning we could use it only once a week, as the patient did not come oftener. From January 2, 1905, on, however, he came every second day, and we applied radium for twenty-five or thirty minutes each time, and always only in the right nasal cavity. After thus treating him four times the patient complained of frontal headache on the right side. This pain grew worse, so that we had to give up radium after trying it twice more. After a pause of two weeks we resumed the same treatment, i. e., every other day exposure for twenty-five to thirty minutes. The result was about the same, and the pain so severe that we discontinued radium treatment

* Of course after thorough cleansing of the parts.

completely after the sixth exposure. The pain was never so intense that the patient could not have borne it longer, if I could have promised him a cure. But not knowing myself exactly in what way the radium emanations would affect the surrounding parts I hesitated to advise its further use.

This case is in such marked contrast to one reported by Joseph C. Beck, of Chicago, that one cannot help noticing it. Dr. Beck reported a case (*Laryngoscope*, p. 903, 1904) of atrophic rhinitis complicated with a tuberculous growth on the septum narium. For the latter radium was applied, and "head-aches and pains disappeared almost after the second treatment."

At this stage of our knowledge it is difficult to decide which of the two cases is the exception to the rule. But judging from the other cases observed I am inclined to believe that my patient had an idiosyncrasy toward these rays, just as some people have an idiosyncrasy toward morphine, etc.

In summing up these cases treated by me I find that in quite a number of them a reaction set in, consisting in burns, ulcerations, etc. This occurred even in cases in which radium was used at intervals of three days, etc. No doubt, we shall in future know better how to avoid these accidents by more carefully measuring the exposures (length of time, and strength of radium), but so far no harm has been done, and they all have healed in a short time. Perhaps in the above case of ozena an ulcer had also formed at some place in the nose, where it could not be seen, thus causing the patient to suffer a good deal of pain. The possibility of such an occurrence is certainly very great.

The advantages of radium over other rays, especially the Roentgen rays, cannot be definitely formulated as yet. Perhaps, it will still take a long time to do so. However, it cannot be denied that the exposure of the body cavities to radium is an easy matter, and that it is much less dangerous than, for example, the X-rays.

We have achieved some real cures in laryngeal tuberculosis, and this fact alone ought to encourage us to experiment further with these wonderful rays.

1003 Madison Ave.

FOR THE DOSIMETRY (DOSIMETRIE) OF THE
ROENTGEN RAYS.*

BY PROFESSOR CARLO COLOMBO, M. D.

Observations and experiments on the physiological and therapeutic properties of the Roentgen rays multiply every day. But the specialists in medical electricity are no longer the only ones to interest themselves in the study of these properties, as was the case until a short time ago; the interest has extended to the clinics and the pathological laboratories, with immense advantage to science.

As always happens, however, at the beginning of every new path of study, two inconveniences are to be regretted, as regards the numerous publications on the action of the X-rays,—the tendency to exaggerate their effects, and the want of precision in the technical details.

Leaving to others the task of remarking on the first of the inconveniences indicated, I wish to draw the attention of the experimenters to this indisputable fact: that no research about the action of the Roentgen rays can have a scientific basis if it does not take into account, with the most absolute precision, the quality of the radiations used and the quantity of rays which are absorbed by the substance or the subject under examination.

Now, in almost every work published recently in Italy, this notion of the dose is either absolutely wanting, or is formulated in a most vague and indeterminate fashion, of which we have an example in the following sentence, taken from an article published in the *Riforma Medica* (number for Dec. 2, 1905):

“As to the apparatus for radio-therapeutics, I used a large Crookes bianodic tube, with appliance for regeneration of the vacuum, worked by a current of 8-10 amperes, with a reel of 30 cm. of spark, and an interrupter which gives about 6500 interruptions. The distance between the walls of the tube and the virus or the eye of the animal varies from 15 to 20 cm.”

Is it possible to draw from these data a norm? for calculating exactly the dose of rays absorbed by the virus or by the

* Brief critical observations by Professor Carlo Colombo, Lecturer on Physical Therapeutics at the University and Director of the Central Institute for Physical Therapeutics of Rome.

eye of the animal under experiment? What was the power of penetration of these rays? or, in other terms, had the rays absorbed by the virus or by the eye of the animal an action on the superficies or a deep-seated action? All these are things necessary to know, because a virus which remains impervious to radiations with a superficial action, might well be modified in virulence by radiations with deep-seated action, and, respectively, remain insensible to small doses of X-rays and not to larger doses.

In the account of technical data above quoted the author gives us a vague idea of the mode in which he sets his coil to work, but no precise indication of the product of his tube, no exact measurement of the quantity of autotoxic agent provided in the experiment. How then can the experiment quoted be repeated by other experimenters with the rigorous exactitude which constitutes the very essence of scientific experiment?

When accounts are given of researches on the action of radium, the authors take care to record not only the precise duration of the irradiation and the exact distance of the radiogenic hearth from the object irradiated, but also the radio-active power of the sample used, determining it in 10,000, 50,000, 100,000, etc.—the conventional units.

And if this measurement appears indispensable in determining the action of radium, it becomes much more necessary in determining the action of the Roentgen rays, the effects of which, although recognized as identical with the V-rays of radium,* are thousands and thousands of times more intense.

By what elements is this measurement furnished?

Let us begin by stating that the data regarding the potentiality of the reel, its method of working in amperes and volts, the rapidity of its interrupter are of no value for this measurement, as it gives with these the most variable results according to the more or less perfect state of isolation of the bobbin (the relative humidity of the air), according to the phenomenon of the hysteresis for the mercury interrupters, or to the instability of the electrolyte for the interrupters of the Weinelt type.

The data we seek can only be furnished by the Crookes tube, and by the mode in which this is placed with respect to the superficies irradiated.

* Thies—Wirkung des Radiumstrahle über Gewebe und Organe. (Mitteilungen aus den Gebieten der Med. und der Chir., Heft 7, 1905.

As to the form of the tube, its make, its size, its system of regenerating the vacuum, these are simply matters for the predilection and convenience of each operator.

All the importance lies in the degree of hardness of the tube and in the mass of X-rays which it is capable of producing in a unit of time.

All who are occupied *ex professo* with radiology know that the X-rays emanating from a Crookes tube have not all the same power of penetration. A soft tube, or a tube in which the rarefaction has become inferior to $\frac{1}{1,000}$ of atmosphere, produces rays with short waves, whose power of penetration is small, so that these do not succeed in traversing the epidermis, by which they are completely absorbed. These are the rays which act on the superficies.

A hard tube, on the other hand, acts in an opposite way. When the internal vacuum is very high, up to $\frac{1}{100,000}$ of atmosphere, this opposes a formidable resistance to the passage of the current in the Crookes tube: and that originates the rays with long and very penetrating waves, capable of making impression on a plate after having traversed the whole of a human abdomen. These are the rays with a deep-seated action.

By means of the so-called osmo-regulators the hardness of the tube may be varied, so as to render it more or less soft when it is hard, more or less hard when it is soft, and consequently the operator can produce with the Crookes tube, rays with much or little penetrating power, at will.

As to the mode of recognizing the grade of penetration of the X-rays, no one can now be ignorant of the marvelous apparatus of Benoist, the radio-chronometer, which allows of the classification of all rays emanating from a Crookes tube in a scale of 12 different gradations, which can be read with ease by a glance at the apparatus. The indications furnished by the radio-chronometer of Benoist are henceforth classical, and no further words of description or demonstration are necessary.

Let us notice another procedure intended to ascertain the grade of hardness of the tube, a more summary procedure, if not more exact than the preceding; we mean the spinterometer of Becière. But this has now become, since the appearance of the Benoist apparatus, a simple warning of the variations of resistance in the Crookes tube.

Less simple is the measurement of the mass of rays pro-

duced by a Crookes tube in a unit of time. A direct or electric measurement was tried, by introducing into the circuit of the tube a milliamperemeter indicating the intensity of the secondary current which passes by the tube itself; but the problem is still far from being solved, on account of the opposing perturbations set up by the variations of hardness in the tube.

Thus it was necessary to recur to indirect measurements, which consist in gathering each time upon a special reagent the whole quantity of radiations absorbed contemporaneously by the substance or subject under experiment. On this principle are based the chromo-radiometer of Holzknecht, the X-radiometer of Tabourand and Noiré, and the more recent radiometer of Kienböck.

To Dr. Holzknecht belongs the honor of having given his name to the classical indication of the quantity of rays absorbed by the superficies irradiated. We say, in fact, that such and such an organ, or such and such a substance has absorbed in a given time a quantity of rays equal to 3, 5, 10, 95 unit H, meaning by 1 unit H, the No. 1 of the scale of control of the Holzknecht apparatus.

As it is easy to understand, many different factors concur to determine the unit H, besides the mass of rays produced by the Crookes tube. There is the distance of the superficies irradiated from the focus of origin of the X-rays, and the direction in which these rays strike the said superficies.

It is necessary, however, to notice how those who measure the distance from the walls of the tube, instead of from the anti-cathode, expose themselves to error. By a very small tube the real distance from the focus of origin of the X-rays is much less than by a tube of large diameter, although the walls of the tube may be placed in each case at the same distance from the superficies irradiated. And a difference of 6-7 cm. is of considerable importance when we consider that the intensity of radiation varies as the square of the distance.

The other factor, lastly, is the direction of the incidence of the X-rays. As for rays of light and heat, so also for the X-rays the normal or perpendicular incidence is that which gives the most intense effects. The intensity of their action diminishes as the obliquity of the direction increases, until at a parallel incidence the intensity becomes nil.

The object or organ under experiment should therefore be

always exposed in such a way that the X-rays may fall normally or perpendicularly on the superficies exposed.

Here then, to sum up, is how the dosimetry data referring to an experiment with Roentgen rays should be given.

"I have exposed to the Roentgen rays a sample of virus rabicus, etc., etc., contained in a plate of 5 cm. diameter, spread uniformly over it in a stratum of 12 mm. in thickness. The said substance has been exposed to rays of penetration No. 7 Benoist, directed normally on to its surface, and has absorbed a mass quantity of rays equal to 24 unit H, administered without interruption in 168 minutes; or, has absorbed fractionally a total dose of 24 H in 12 daily exposures of 14 minutes, during which it absorbed each time 2 unit H."

Any other details would be superfluous taken in conjunction with the preceding dosimetric data, and without them would be quite valueless.

These considerations on the dosimetry of the Roentgen rays do not refer solely to the experimental researches from which we started. Exactitude of measurements is still more indispensable in the therapeutic application of the rays, that is to say, in radio-therapeutics. All specialists have now been obliged to admit that the unknown cause of the unexpected and terrible radio-dermites of 3d and 4th degree, was due to nothing else but the want of means for controlling the dose of so active an agent. The human skin is a most delicate filter of the Roentgen rays. It keeps back all rays of short waves emanating from soft tubes and corresponding to grades No. 1 to No. 5 of Benoist's radio-chronometer; and a dose of these rays scarcely superior to 5 unit H given at one time, is sufficient to compromise the integrity of the skin.

In consequence of this, the following norm has become of constant use in radio-therapeutics: When it is necessary to operate on a surface where the skin is already ulcerated or, in any way, injured, or else when the case presents a serious morbid form, in which the possible lesion of the sound skin by means of the X-rays is of negligible importance compared to the therapeutic advantages which are to be expected from their use (as would be the case in malignant inoperable tumors, of fatal prognosis, where intervention is urgent) the dose limit of 5 unit H may be exceeded with impunity to the extent of the maximum of 10-15 unit H at one time. In all other cases, it will be the doctor's duty to keep within the bounds of the dose limit of 5 H; because no benefit, however great, to the health or well-being of the patient, would justify the risk of producing profound cutaneous ulcerations, the cure of which is always accomplished with much difficulty, and never without leaving disfiguring cicatrices.

THE COSMETIC VALUE OF ELECTRICITY.*

BY LAURA VIOLA GUSTIN-MACKIE, M. D., ATTLEBORO, MASS.

The love of the beautiful in some form is inherent in every heart, and the desire to possess beauty is one of the highest impulses of the soul. At some periods in the world's history, an idea has been prevalent that this desire indicates the possession of a shallow, and even sinful nature, that these natural impulses, being of the earth earthy, must be crushed out. In our time, the cultivation of the beautiful in mind and person is encouraged in every legitimate way and it becomes the duty of the true physician as well as the teacher in art to render such assistance as may come within his province, to further this object. I conclude that the general practitioner does not give the same attention to disfiguring disease as to other conditions in which more apparent suffering is shown, or as much as the subject actually demands.

This may be from several causes. He may not in all instances sufficiently appreciate the mental suffering, depression, mortification and consequent lack of confidence, resulting from many of the more common skin diseases, for instance. Another reason may be the persistence of that old impression that this matter of blemishes and diseased conditions that do not affect the life and death of the patient are the province of the specialist or the beauty-doctor, so called, and not of sufficient importance to claim the serious attention of the scientific physician. It is gratifying that this narrow view of the subject is fast passing away, as is proven by the largely increased reference to methods having this for their object, in many of our leading periodicals; and that now, it is no more derogatory to professional dignity to restore mental poise and consequent usefulness by the removal of an unsightly birth-mark or other facial blemish, than by the removal of an appendix or a fibroid of the uterus. The question in each case is one of ability and duty.

Results by the older methods of medication, alone, are so often ineffectual and at best unsatisfactory that the average patient usually becomes discouraged at seeing so little improve-

* Read at the Fifteenth Annual Meeting of the American Electro-Therapeutic Association, at New York, on September 20, 1905.

ment and is sent or goes on his own account to a specialist, who often forgets or is unable to reciprocate and not only financial loss but professional skill is hazarded by this change. Or, what is still more serious for both patient and physician, that assistance and encouragement he desires is found from consulting the many irregulars, whose names are emblazoned in conspicuous places in all our towns, and whose wonderful exploits, in the cure of all manner of disease, are heralded in our local papers. All methods and treatments should be carefully investigated and what is good heartily welcomed and made part of our armamentarium in the battle with disease, and no ill to which mankind is heir be considered too trivial to receive attention, though many of these lesser ills which make life a burden and deprive the future of hope are in no sense fraught with danger to life.

In electricity, we have a powerful accessory to other therapeutic methods, the utility of which is no longer questioned. The results obtained from its use are definite. We have currents of known qualities and quantities, instruments of precision by which we may know beyond conjecture the strength and quantity of current employed.

We have the human organism, the tissues of which have certain physical properties which respond to definite stimuli. We have also, an approximate knowledge of its physiology and pathology which enables us to apply the various modalities with a certainty that positive and uniform results will accrue.

The subject of the electro-therapeutics of skin disease has been comprehensively treated in a considerable number of our later books. Those devoted to electro-therapeutics exclusively, give much information regarding the physiological action as well as the approved methods of application, and in all of the later books there is at least favorable mention, under the head of treatment. This shows the rapid strides into general favor made by this agent during the past few years. Referring to *older* works, we find no mention, advocating this valuable adjunct to other methods.

The reports of the following cases are from personal observation, and selected as typical of the variety of common forms which present themselves to the general practitioner for relief; not from physical pain at first, but because of impair-

ment to their personal appearance, and in which one or all of the electric modalities are especially useful.

The numbers of this class are not large when compared with those encountered at public dispensaries in our cities, afflicting as they largely do those who by occupation or for business reasons spend their lives in unhealthy and unsanitary surroundings. Though not in record-making numbers, we do meet them with sufficient frequency to make it worthy of a careful study of the best means of treatment. These cases include many abnormal conditions differing in importance, and include those malignant diseases: sarcoma, carcinoma, epithelioma, also those tubercular diseases (the most interesting to us from a cosmetic standpoint), being lupus vulgaris and erythematosis, because of the rapid and terrible disfigurement resulting. Often a patient consults his medical attendant early in the disease, not because of any symptom of suffering, but simply that he does not like the disfigurement which he feels makes him noticeable. These, as enumerated, are all diseases of a condition of lowered vitality and whatever theory we adopt as to their origin, they are treated both surgically and systemically. We have in the various electric modalities at our command, the power of treating disease electro-surgically and electro-medically, and not in theory alone, but in practice, as the results in the hands of many operators testify, produce the most satisfactory results.

Lupus, in particular, chooses frequently for its starting-point, a place where the blood-supply is poor and where there is little subcutaneous fat, viz.: the nose or the ear, traveling with more or less rapidity over adjoining surfaces, destroying tissue, and presenting a most revolting sight.

I mention this class and leave them for others to discuss, as not belonging strictly to our subject since the cosmetic effect is not the result aimed at by treatment, although this is accomplished. We have reason to rejoice that in the powerful action of the X-ray, high frequency currents, and actinic rays, there has been achieved partial control at least, over those conditions that had been in the past considered incurable and hopeless. It is no wonder that in our enthusiasm we grasped the hope and were led to inquire if in these wonderful manifestations of this new agent, the problem of cure of many of the obscure and fatal diseases had not been solved. The fact that all the hopes of the more enthusiastic ones have not been fully

realized, does not detract from the positive good resulting from these measures. From all the sources at my command, the consensus of opinion seems to be that many seemingly hopeless cases have been absolutely cured, and many more symptomatically cured as is shown by the establishment of the process of repair, in the reduction in size of growth and spread of ulcerated surface, cessation of discharge, and disappearance of odor, as well as improvement in the general healthful conditions of the entire mechanism. However, it may be possible that in the contemplation of the wonderful results obtained from these newer methods and agents, and the more imperative nature of these conditions, we may slight the commoner ones which cause much mental suffering and the older methods found useful before these were discovered.

It is in the chronic skin diseases, which often attract the attention of the patient primarily by marring some portion of the face or other exposed portion of the body, that we find much to interest us in connection with the cosmetic application and the usefulness of electricity. Among these we find the angiomata, acne, chloasma, leucoderma, the chromotogenous diseases; tinea, nevi of all descriptions, eczema, verruca, lentigo, keloid, as well as alopecia and hypertrichosis.

A little consideration relative to the electrolytic and cathodic properties of the continuous current will convince us of its special value in these conditions. We know that its action upon normal tissue is to increase activity, and we naturally expect and are not disappointed in its action upon abnormal tissue; resulting as it does in inducing increased absorption and elimination through natural channels, of the product of chemical changes. Many benign as well as malignant tumors affecting the skin have been successfully removed by this means. The result depends largely upon the skill of the operator and the methods employed, as in any other surgical procedure. It is in connection with the removal of the various erectile tumors: angiomata, nevi, etc., that our subject especially deals. Perhaps the most frequent and distressing to the young, in whom it most often occurs, is acne, in its varied types. In middle or adult life it occurs in the form of acne rosacea, menacing the peace of mind and spoiling the prospects of many who would otherwise be ornaments to whatever position they were destined to fill.

We need consider only two varieties of this affection for treatment by electrolysis: acne vulgaris, in which the lesions are of mixed character, consisting of comedones, papules, pustules, and indurated masses, of slow development, which leave pitted scars when untreated and allowed to rupture spontaneously.

Several very unsightly and persistent cases of acne vulgaris have come under my care within a short time, that had been previously treated by the regulation method of internal medication, and locally by lotions and unguents, with no appreciable results.

In the beginning of treatment, in this as in all skin diseases, the endeavor was to find out any factor which related to the cause or continuance of the eruption.

All the organs of the body, as far as possible, were induced to functionate properly. The necessity of pure air, wholesome, well-cooked and nutritious food, regular habits of exercise, sleeping and eating, baths and personal hygiene were explained. Until these conditions are understood and one has reason to believe that directions will be carried out it is useless to undertake special local treatment. By emphasizing this the impression is fixed in the mind of the patient that he has some responsibility in the result aimed at and that the permanency of the cure rests in a great measure upon his faithfulness to these details.

The first step in the local treatment was the thorough cleansing of the parts affected. With sterile gauze and hot suds made with some antiseptic surgical or green soap the parts were freed from all impurities, such as dust, scales, and dried discharges. The pustules were opened with a lancet, the comedones pressed out and bleeding encouraged. The patient was then placed on the insulating stool for general nutritional treatment by the static machine; following this, the diseased surface was brought in contact with the discharge from a high frequency tube. A few minutes was sufficient to produce hyperemia and the patient complained of the stinging and smarting.

This was followed by a local use of the continuous current of from two to four ma. by a labile application. The negative electrode was applied to the now reddened surfaces and the

positive over the sympathetic (subaural) which lessened the congestion, and with the application of some dusting-powder the séance was ended and the patient requested to return on alternate days.

In such cases, unless the lesion has been of very long duration and more than ordinarily severe, after ten or fifteen treatments marked improvement is evident; most of the pustules have been emptied and the process of resolution established. There may remain some old indurated masses and an occasional pustule may appear. With an ordinary No. 12 sewing needle these are thoroughly punctured, passing the needle through the hypertrophic mass in various directions, care being used that the intensity of the current is not such as to produce scarring from deep ulceration, as may occur with a current of more than four to six ma. The entire purpose of the operation is to cause absorption and retraction of the fibrous tissues as well as obliteration of the vessels.

In acne rosacea, much the same methods are found to be necessary, supplemented by the electrolytic destruction of the visible arterioles. This can be accomplished by using a No. 12 needle, connected with the negative pole and puncturing individual vessels, thereby causing coagulation. A moderately weak current is sufficient and need not exceed four to six ma. In still other cases, where the vessels are unusually distended and tortuous and attended by frequent and obstinate flushing of the whole face, cataphoresis can be most satisfactorily utilized. We can use an electrode of block tin or silver, rolled very thin, and made, by gentle pressure, to fit the face; the metal having first been covered with absorbent cotton, wet in adrenalin chloride (sol. 1 to 500). With the patient in a recumbent position, the electrode will easily stay in place and a twenty-minute séance with a current of ten milliamperes is easily borne. On removing the plate, the parts are found blanched, and this is a favorable moment to use the electrolytic needle, for considerable anesthesia exists. This is a process of cosmetic value, because the congestion, though returning, never seems quite so marked as before, and by repeating the procedure, the cure seems to be hastened and no constitutional effects have so far been observed.

(To be concluded)

FACIAL PARALYSIS.*

BY FRANCIS B. BISHOP, M. D., WASHINGTON D. C.

Member Medical Society, of D. C.; Member and Ex-President Medical and Surgical Society, D. C.; Member and Ex-President American Electro-Therapeutic Association; Member American Medical Association, and Society Electro-Therapeutics, Paris, France; Delegate from American Electro-Therapeutic Association to International Congress Physio-Therapy, Liege, Belgium, August, 1905; Delegate for the United States to the International Congress Physio-Therapy, Liege, Belgium, August, 1905; Member Medical Society of Northern Virginia; Member Therapeutic Society, D. C.; President American Committee, International Congress Physio-Therapy.

Every text-book on diseases of the nervous system contains a more or less elaborate description of this disorder as well as its treatment. It is one of the most common of all localized paralyses and owing to the fact that the seventh nerve supplies all the muscles of expression of the face, paralysis of this nerve becomes at once one of the most noticeable and disfiguring. It may be due to a lesion anywhere along the course of its fibre from its cortical centre to its nucleus in the medulla, and from this nucleus to any or all branches distributed upon the face. It is generally unilateral, except when due to a lesion of the medulla or pons, and it is then associated with paralysis of the muscles of the throat, tongue, palate, etc., as in glossopharyngolabial paralysis. If the lesion is between the cortical centres and the nucleus the facial paralysis will be generally associated with paralysis of an arm, or leg, or an arm and leg of the same side, the upper facial muscles are unimpaired and the electrical reactions are normal. When the lesion is between the decussation of the fibres in the pons and the facial nucleus, there is a paralysis of the facial on the side of the lesion and a paralysis of the extremities on the opposite side with normal electrical reaction.

A lesion in the nerve from the nucleus to any part along its course and distribution on the face is considered a peripheral or Bell's paralysis. It is the most common type and the type to which our attention will be called this evening. The disease is liable to come on suddenly and the paralysis is complete in a few

* Read before the Medical and Surgical Society of the District of Columbia, Thursday evening, March 1, 1906.

hours or a day or two, preceded or not by some pain in the ear and swelling over the sub-auricular fossa. All the muscles of one side of the face are generally paralyzed and the appearance is very characteristic; there is a total lack of expression on that side, an effort to laugh or smile draws the mouth well around on the sound side, the eye cannot be closed on the affected side, an effort to do so pulls down the upper lid and rolls the eye up under it, showing little but the white. When the patient tries to wrinkle the brow the wrinkles show only on the sound side, the tears failing to find their way through the nasal duct, fill the eye and roll down on the cheek. For the first few days there is usually but little change in the electrical excitability of the nerves and muscles to either current but gradually the induction current loses its power to excite the end organs of the nerve upon the periphery and the muscles do not any longer contract under the stimulus of that current. They may still contract to a moderate continuous current excited more easily even by the negative pole, but the contractions now become sluggish and wave-like, finally the muscles contract more quickly to the positive interruption and with less current. Here the reaction of degeneration is well established. This condition may go on for several weeks or months before the normal reaction gradually returns, excitability to the induction current returning last and in many cases after the patient has recovered some control of the paralyzed muscles.

This disease is undoubtedly a neuritis of the facial nerve and it is due to toxic or infectious influence. Exposure to cold is given as a cause of this disease in over seventy per cent. of the cases. The exposure may check temporarily the metabolic processes in the nerve and allows any infectious material that happens to be in the system at the time to attack it and produce a neuritis. Gout, rheumatism, diabetes-mellitus, diphtheria, and many other diseases have been given as causes for facial paralysis or Bell's palsy.

The views of the writer are so nearly in accord with those of Oppenheim on diseases of the middle ear as a cause of this disease that a short quotation from this able writer will not be out of place here. He says, "*Disease of the middle ear and caries of the petrous portion of the temporal bone may easily involve the facial.*" This nerve lies so near the tympanic cavity, and is separated from it by so thin a lamella of bone, that the inflammation easily passes to it. Facial palsy may result from an otitis and both these diseases may be caused by the same disease; for example, in exposure to cold, influenza, typhoid, etc. It is often injured in caries of the petrous bone, it may follow a tonsillitis or mumps. This disease frequently follows a radical operation for middle ear disease, and has been attributed to traumatism. I have seen, examined and treated a number of

these cases, but in one case only have I been satisfied that traumatism played any part whatever in causing the trouble. In this one case the general infection was quite severe and a number of abscesses were opened about the face; two small branches of the facial were necessarily cut; the patient made a tedious but good recovery.

One of the worst cases that I have on hand now is a case of infectious neuritis of the facial, caused by middle ear disease that has never been operated upon.

It becomes necessary to locate as nearly as possible the lesion in the cases that come to us and the plan outlined by Erb many years ago is the one we still rely upon for our diagnosis. "If the facial is attacked at the base of the skull we would expect paralysis of the auditory and other cranial nerves together with general cerebral symptoms (headache, vertigo, vomiting, etc.)." If the lesion involve the nerve between the pes anserinus and that point where the chorda-tympani is given off the facial muscles alone are paralyzed, if between the latter point and the stapedius nerve, the taste will be lost on the anterior two-thirds of the tongue in consequence of the involvement of the gustatory fibres of the chorda-tympani nerve. If the lesion is between the stapedius and geniculate ganglion, the stapedius will be involved, producing hyperacuity of hearing. If the geniculate ganglion or the nerve above it is involved the velum on same side is paralyzed. The prognosis in the majority of cases is good even when the nerve has been paralyzed for many months and the muscles show absolute signs of degeneration. Care and patience will often restore tone and energy after many weeks or months of careful treatment. Sometimes we meet cases where it seems almost impossible to restore energy equally to all muscles involved, but nearly all cases can be improved. Again, we sometimes meet those unfortunate cases that will, in spite of all our efforts, take on a spasmodic activity on the paralyzed side; a possibility that should never be lost sight of in the treatment of these cases. The treatment must of course depend upon the cause and as to whether the cause still exists. If we can find the cause, appropriate remedies must be given and the remaining neuritis must be treated according to its stage and severity with electricity. This seems now to be the opinion of all authorities upon this subject. It has been the opinion of the older writers that electricity should not be applied during the first two or three weeks, but experience has taught that the earlier the case comes under treatment the better and quicker are usually the results. The patient should be instructed to hold the paralyzed muscles in place as much as possible, especially when laughing, to sleep on the affected side, and keep the eye closed with the hand while in bed, if necessary.

As regards the electrical treatment I presume that we all have

our special methods, and I will here outline the method that I have adopted, and which in my hands has been very successful. If upon examination we have reason to believe that the lesion is well up in the eustachian canal and in the first week we find evidences of degeneration, we may rest assured that the case will recuperate slowly, and we must not be surprised if the muscles show signs of wasting before they show signs of improvement. If the lesion is near or outside of the stylo-mastoid foramen, we may look for quicker results under the same conditions of reaction. It is my custom to treat these cases much on the same plan as that used in treating other cases of localized neuritis. To begin with I treat them with a mild continuous current from fifteen to twenty minutes each day in some cases, and in others every other day. If the case is seen early before the muscles begin to waste, three to four times a week is usually often enough; if the muscles are already wasting, I treat them every day, using a large pad electrode as high up on the back of the neck as possible; I connect this with the positive pole, while a small negative about one inch in diameter is pushed against the exit of the nerve and held firmly in position. A gentle current is turned on, representing four or five milliamperes and allowed to pass from five to ten minutes, when this is replaced by a large flexible electrode that covers all the muscles of the face; through this a current of from eight to ten milliamperes is allowed to pass five to ten minutes, testing each day very cautiously the conditions of the muscles and watching for the muscles that show the first sign of normal reaction or volitional movement. These muscles are carefully avoided in the future treatment of the case until the others show signs of returning normal condition. My reason for using the negative pole upon the periphery in the treatment of facial paralysis is that I am convinced by long experience that we establish physiological function in a nerve much quicker when we send our current in the direction of the natural flow of the nerve impulse. By watching the progress of each muscle and never overstimulating any of them, we may in many instances prevent the irritable contraction which so often complicates the progress of the case.

As soon as the peripheral organs of the motor nerves will respond to the induction current this current should be used, at first very gently, and at no time should a muscle be held in contraction, but should be stimulated by an interrupting electrode, and as much time given between each contraction as is given to the contraction itself. Even when we do our very best, in bad cases there is apt to be some deformity for a long time.

Editorial.

THE UNSCIENTIFIC USE OF ELECTRICITY AND CONSEQUENT FAILURES THE CAUSE OF PREJUDICE AND SKEPTICISM.

HOW often it has been the case since the early days of electricity that some member of the profession who has known little or nothing of its actions has done serious injury to a patient and from that time condemned it *in toto*. It is not until recent years—within the past thirty—that much that will stand as future technique has been known of electricity in therapeutics. There is now much rubbish that must be cleared away, and a more simple rational therapeutics be established before the repeated failures of the therapeutic adventurers will cease to bring reproach incessantly upon the medical use of electricity. It is not possible for a man without a large experience which is likely to have been fraught with numerous unpleasant experiences to his patients, or a proper training under a master of the art, to employ electricity successfully. Failure with the uninformed is represented to be the fault of electricity and not of the novice himself.

The physician's medical degree, or right to care for the sick does not yet carry with it a certificate of the knowledge of the employment of electricity, and is not likely to, until the medical colleges recognize its value and place the instruction in this important branch in the hands of men who understand its principles of action, and employment.

There are periods in professional history when for one reason or another attention is called to the value of the therapeutic employment of electricity, and every one who can then afford an apparatus for a particular purpose does so, has one or two mishaps and abandons it. How often after Apostoli advised the continuous current for the treatment of fibroids did mishaps occur? Often enough that many surgeons, who in ignorance used it, thereafter condemned it; while others who were properly posted succeeded and have continued to in a fair percentage of cases. The same was true to a less degree of the Botini method.

Now men are buying X-ray coils, static machines and high frequency apparatus. Of these a small percentage will master

the subjects and succeed, while the mass will fail, and the failures will be accredited to electricity, and the public prejudiced in two ways: (1) by the natural failures and (2) by the criticism of members of the profession who have not the facilities and do not want to bother with its use, and are therefore looking out for these failures on which to condemn it. With these last, the successes of the trained and successful therapist are galling, and their character is such that they would sooner discredit the success than to seek to investigate the truth.

There will be enough to satisfy these skeptics in the results of the X-ray coil men, who can make desultory use of their high-frequency apparatus, no matter how employed, it will be expected to cure anything that can be cured by electricity, or there will be nothing in it. By these and the men with static machines, who have them for office ornaments, is electricity certain to be brought much into disrepute.

There is no brighter and more luring field than the therapeutic uses of electricity in its various ways, and no one which, in the hands of the scientific and conscientious physician, will contribute so much relief to suffering humanity.

* * *

THE INTERNATIONAL MEDICAL ASSOCIATION TO ASSIST IN THE SUPPRESSION OF WAR.

Under the leadership of Dr. J. Riviere of Paris, France, president of the association, an energetic effort is being made to put the medical profession on record as opposed to war. Probably no body of men would exert greater power if united against that relic of barbarism, which does not properly belong to a civilized age. Universal peace with the united coöperation of the nations under a great tribunal should replace the barbarities of war. It should only be necessary to resort to war as a defensive or corrective measure against the nations which are still uncivilized. For civilized nations to engage in warfare is analogous to enlightened individuals settling their difference with the rifle or sword. It is hopeful, therefore that the great medical profession will lend its voice and influences to bring about the recognition of this humane principle and thereby assist in inducing the establishment of an international law which shall render war an impossibility.

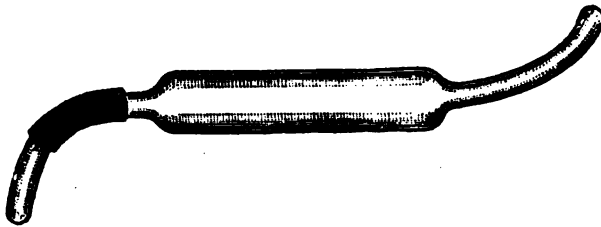
Progress in Physical Therapeutics.

CURRENTS OF HIGH FREQUENCY AND HIGH POTENTIAL.

EDITED BY WALTER H. WHITE, M. D.

A New Method of Applying X-ray to Lupus of the Nose and Other Cavities. By J. Hall-Edwards, L. R. C. P., in the *Journal of Electrology and Radiology.*

"The accompanying illustration shows a form of vacuum tube electrode which is useful for applying X-rays in small doses to the interior of the nose, mouth, ear, and other cavities, which I have recently adopted with good effect. There is nothing novel in the idea, as a somewhat similar method is generally adopted, but the novelty consists in the employment of a new electrode and in the method of using it. Highly exhausted electrodes have been used in conjunction with a high frequency apparatus for utilizing small quantities of X-rays in addition to the high frequency current. These electrodes were generally attached to one end of the small solenoid, and the current passed directly through them to the patient.



Used in this way the electrodes are soon spoiled, either by the vacuum running up too high or by the passage of a spark through the glass. Again, the application of ordinary high vacuum electrodes to the cavity of the nose is apt to be painful, and the sparking from the tube to the free edge of the nostril is an inconvenience. The electrodes which I use are made for me by Mr. Cosser, and are highly exhausted tubes without any metal terminals. The mode of application is as follows: The patient is placed upon the high frequency couch, which is connected to the solenoid in the ordinary way. The operator then takes the electrode in his hand and brings it into contact with the affected part, and thus sets up a flow of current between the patient and himself along the tube. In order to avoid sparking round the nostril the device of a short length of rubber tubing slipped over the glass, as shown in the drawing, is efficacious. Tubes used in this way last a long time. I have

recently treated two cases of lupus with great success by proceeding in this method."

[It seems to me that the effect is due simply to the use of the vacuum tube discharges and not to the X-ray, as the X-ray is only present immediately outside the orifice, as can be demonstrated by holding a vacuum tube in the hand.—EDITOR.]

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

"Therapeutics of the X-Ray." By Gordon G. Burdick, M. D., in Wisconsin Medical Recorder, February, 1906.

In this interesting paper he gives a report of eighteen cases of primary carcinoma that had been dismissed and not under treatment for three years and over.

Case 1.—Female aged twenty-two. Scirrhus of breast, demonstrated by microscopic examination; treated by X-ray in 1900; splendid result, and no recurrence to date.

Case 2.—Aged twenty-eight. Cancer of left breast the size of an orange. Treated eight weeks, when a slight reaction occurred, and the treatment was suspended for three weeks, when it was resumed. At the end of four months the tumor was the size of a filbert, and in one year it was entirely gone and there has been no recurrence.

Case 3.—Age nineteen. Cancer of left breast, and glands involved. In seven months the cancer had entirely disappeared, and there has been no return.

Cases 4, 5, and 6 were post-operative cases. Four and five improved rapidly, but finally died of cancer, and No. 6 was not affected.

Case 7.—Aged forty. Orange-size tumor in left breast; nipple retracted and axillary glands involved. Tumor reduced to the size of a walnut. Glands all disappeared and patient has continued well to date.

Case 8.—Case of carcinoma of wrist. Dermatitis produced, which healed and carcinoma improved very rapidly. No recurrence.

Case 9.—Epithelioma of tongue. Dismissed in three months, and there has been no return to date.

Cases 10, 11, 12 and 13 were all breast cases, and diagnosis confirmed by microscope. All were healed and discharged in about four months' time, with perfect results, and there has been no return.

Case 14.—Case of cancer of nipple. Severe dermatitis followed the X-ray, but the case improved rapidly to recovery. No return.

Case 15.—Cancer of lower lip. Ulcer healed in six weeks and induration disappeared in three months. No return.

Case 16.—Carcinoma of the colon. Diagnosis confirmed by operation, but nothing was done but removal of piece for microscopic examination, when wound was closed again. The colon was involved for a distance of eight inches, while the omentum was seriously involved and adherent everywhere. X-ray treatment was begun with a high tube and the case progressed satisfactorily. All evidence of the growth has disappeared, and there has been no return after four years, but her life has been a burden on account of an irritable bladder, caused, he thinks, by an internal X-ray burn.

Case 17.—Scirrhus of left breast, with axillary glands enlarged. Tumor reduced to size of walnut. Glands all disappeared and the patient has remained well ever since. No return.

Case 18.—A very large scirrhus of right breast. No effect from X-ray was obtained except the relief from pain. It was destroyed by mercuric cataphoresis, and there has been no return.

Case 19.—Carcinoma of left breast, with glandular involvement; disappeared entirely, and there has been no return.

In post-operative cases he has only had good results in about twenty-two per cent. of his cases.

"The Cure of Carcinoma by Means of X-Rays." By Dr. Heine Wohlgemuth, Berlin, Germany.

This paper was read before the Roentgen congress in Berlin to especially counteract the theory and teaching of some that it is impossible to reach deeper than one-half of a centimeter with the X-ray. Lassar had demonstrated that on a microscopic section the rays had penetrated only to the depth of half a centimeter, but Wohlgemuth showed that only ten treatments had been administered and then nothing had been shown as to the penetrating power of the tube nor the amp. used. He proves in his case reported that the rays did penetrate to the distance of three centimeters.

A carcinoma of the left breast, about the size of an apple, having the surface ulcerated and axillary glands enlarged, was treated with the X-ray, and in two months and a half the case was entirely healed, and the glands returned to normal conditions. There has been no return of the disease and the rays must have penetrated at least three or four centimeters.

"Radium Therapy in Skin Diseases." By F. M. Dearborn, M. D., N. A. Journal of Homeopathy.

The doctor has experimented with four different strengths of radium, and it would seem from reading his paper he has been

disappointed with all of them, and considers it in a general way far inferior to the X-ray as a general therapeutic agent.

THERMOTHERAPY.

EDITED BY DAVID E. HOAG, M. D.

So many queries come to this department from month to month relative to the technique of the administration of dry hot air therapy, that the editor has deemed it wise to endeavor to answer some of them in this month's issue, rather than by personal letter. It is to be hoped, however, that no correspondent will regard this as a breach of etiquette, or a lack of desire on the editor's part to answer their communications. But since there were no specific inquiries regarding any particular case, the information can be given as well this way, as by personal reply.

One of the bugbears that seem to exist among doctors who endeavor to administer this form of treatment, is an apprehension on their part regarding their ability to manage the apparatus, as well as to prevent the prospective patient from sharing this apprehension.

(1) Apparatus for this purpose are usually constructed on the same general plan. (I refer now to the body apparatus, as that seems to be the one concerning which the most mystery exists). A cylinder is constructed large enough to admit the body, and permitting sufficient air space, furnished with facilities for furnishing heat underneath, which may be either from gas, gasoline or kerosene, lined usually with asbestos, with a chamber for the circulation of hot air between, provided with vent holes in the top for the removal of moisture, and also with a high temperature thermometer for noting the degree of heat attained; the sliding platform on which the patient lies permitting of ease for the insertion and removal of the patient. A hood from above and also one below to more completely prevent exposure of the head and face to the heat is also an essential part of the apparatus.

A very complete and concise description of the apparatus in most general use, can be gotten from a book written by Skinner, of New Haven, Conn., which is the most complete manual which has yet been published. It will be seen, however, that there is nothing complicated or mysterious about the construction of the apparatus, and apprehensions should not exist on the part of the operator, after he once becomes familiar with the general technique. So far as the fears of the patient are concerned, it can be readily understood that when they become aware of the fact that they are to be subjected to a temperature of 350° or 400° F., and when they further realize that water

boils at 212° , it is no small wonder that they have doubts as to their safety. This can be overcome, however, largely by the show of confidence of the operator.

One of the precautions before the administration of a treatment, is to see that everything about the machine is in perfect order, and there is no inflammable material in the apparatus; then light the gas, or whatever is used for heating purposes, and let the machine warm up for several minutes preparatory to receiving the patient. In this time it will be observed that the heating arrangements are burning properly and right, no escape of gas or unnecessary odor.

I remember very well a case of my own in which this precaution was not taken, and during the lecture, (it being a demonstration before a class of students) much to my mortification the odor of something burning became noticeable, got gradually worse, and as a smudge filled the room, and the patient became alarmed, we withdrew her from the apparatus and found one of the Turkish towels, used for wrapping purposes, not aflame, but smoldering. Of course, no harm was done, further than that of frightening the patient. I will add, however, that this patient could not be induced to take another treatment.

The patient should be prepared for treatment by removing all the clothing and donning an ordinary bath-robe made of Turkish toweling, and this should be supplemented by long loose stockings of the same material, long enough to reach to the knee. If the hands are also to be inserted, loose mittens should be worn. There is no fixed rule as to the amount of wrapping necessary—the average patient requires three thicknesses. We already have one thickness in the gown and stockings, and the additional thicknesses are made by wrapping of Turkish toweling applied to the body and limbs. The wrappings should be so applied as to come closely in contact with the skin at all points. When this is not properly done, a burn or scald is likely to take place, for the reason that perspiration soon forms, and not finding an absorbent, a scald results from boiling under the high temperature.

Having the patient properly prepared, as above described, he should then be pushed into the apparatus on the sliding table, or otherwise closed in according to the type of apparatus employed, and the hood, which is made of ticking, pulled down to prevent the heat from striking the exposed face. It is usually customary to insert the patient as far as the arm-pits, sometimes to the neck, depending upon the degree, or rather extent, of treatment required. The heat may then be fully turned on. An apparatus that is properly constructed, should be capable of attaining a heat of 350° or 400° in fifteen minutes, and maintain it there indefinitely.

It has been found that the temperature and pulse are the best

indications as to the length of time the patient should remain in the apparatus. Although the high registering thermometer belonging to the apparatus may denote the amount of heat that the apparatus is capable of producing, it has no bearing whatever upon the length of the treatment. At the end of fifteen minutes, the patient's temperature and pulse should be noted. At that time there will be found a slight increase in both. This should be recorded, and the temperature and pulse taken each five minutes until the end of the treatment. An increase of two degrees in the temperature, or if the pulse reaches the rate of 120, is regarded as a sufficient indication that the patient has received the full quota of treatment permissible for that particular time. These need not occur simultaneously, but should either the pulse or the temperature reach what is called this maximum degree of safety, the heat should be immediately turned off. In a particularly weak or debilitated, or aged patient, or one suffering from any heart lesion, or again in a particularly apprehensive patient, one perhaps who is taking treatment for the first time, it is best not to prolong the treatment. The principle to be observed during the course of the treatment, is to maintain care and watchfulness throughout. The nurse should see that the perspiration, which is usually copious, is frequently wiped from the eyes and face. An ice bag upon the forehead is not only comforting, but soothes and allays the slight headache which sometimes occurs.

Occasionally the patient will complain of some particularly vulnerable spot, which seems to be especially hot, almost seeming to burn. The cause is usually found in an improper application of wrapping, and the operator can, by raising the hood, insert his hand into the apparatus, and place the wrappings more closely over the sensitive area. The toes and heels usually suffer the most in this respect, often due to a faulty circulation. Secondly, these parts should receive particular attention in wrapping, so that they shall be firmly, but not tightly ensconced in the absorbent toweling.

Water may be given at any time during the treatment, if the patient becomes thirsty, but should not be given in large quantities. The patient should be charged to assume any position which seems the most agreeable to him, but should remain quiet throughout the course of the treatment.

After the heat has been turned off, the patient should remain* in the closed apparatus for ten minutes. After that he can be taken out, and should remain perfectly at rest for twenty minutes more. Usually by this time, the temperature and pulse will have reached the normal. He should then be given a tepid bath, well soaped, rinsed, and put to bed. He should then have a thorough rubbing with alcohol and be left to sleep or rest for an hour or two, after which he may dress.

Different individuals exhibit different degrees of susceptibility, and each patient must be handled according to his own law. What is wanted is the deep reflex response, hence the necessity of intelligent thorough treatment. Patients not treated up to this point do not get their full due in the way of benefit, and discredit is reflected upon one of our most valuable therapeutic agents.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

The Rationale of Moist Cold Applications in Acute Contagious Ophthalmia.

Weeks (Journal of the American Medical Association of December 10, 1904), says that in considering this matter it is well to bear in mind the thermal conditions under which the pneumococcus, Koch-Weeks bacillus, gonococcus, and Klebs-Loeffer bacillus develop. The thermal range of development of the pneumococcus is between about 55° to 110° F., of the Koch-Weeks bacillus and the gonococcus, 88° to 110° F.; of the Klebs-Loeffer bacillus, about the same as the pneumococcus. The object of cold applications is really to inhibit the growth of the specific micro-organism. This can be accomplished in the cases of conjunctivitis caused by micro-organisms that do not develop below 88° F., as by cold applications the temperature of the conjunctiva may be reduced, approximately, to 92° F. In cases due to micro-organisms that develop below 92° F., cold does little good.

Moist heat applied to the lids cannot be employed to raise the temperature of the conjunctiva above 110° F., seldom above 102° F., consequently it is of no value as an agent to inhibit the growth of the micro-organisms concerned. It is only of value to assist in disposing of effete material, plastic or otherwise, which may be present in the tissues by rendering the flow of blood and lymph more free.

In pneumococcus conjunctivitis, cold applications when applied should be made for from one to two hours at a time, with intervals of from one to three hours, as desired. In these cases, if severe, a solution of a salt of silver in water (protargol 10 per cent., or argyrol 20 per cent.) should be dropped into the eye two to four times daily. When the subacute stage is reached, the protargol and argyrol should be discontinued, and, in addition to the cleansing of the eyes with boric acid solution, an application of nitrate of silver (0.5 per cent.) may be made to the conjunctiva once daily if required. Experience has proven that protargol, and to some extent argyrol, leave the conjunctiva in a slightly thickened condition if their

use is persisted in long after the acute stage has subsided, and that some other astringent, particularly the nitrate of silver, will cause the conjunctiva to return to a normal condition very much more rapidly.

The conjunctivitis due to the small bacillus requires similar but more energetic treatment. Cold applications are positively indicated in the acute stage. They should be made from two to three hours at a time, the interval between periods being from one to two hours. The cleansing of the eyes must be performed more frequently, and the solution of silver salts also used more frequently.

In the conjunctivitis due to the gonococcus, similar measures may be employed in a somewhat more vigorous manner. The solution of protargol should be 15 to 20 per cent., and the solution of argyrol 30 to 40 per cent. The solution used should be freely dropped into the eye every two hours in severe cases during the acute stage, somewhat less frequently in the milder cases. Cold applications should be made for a longer period of time and the intervals should be shorter. The tendency of the lids to become glued together may be combated by the introduction of borated vaselin (5 per cent.) or bichloride vaselin (13.000 to 1.5000) into the conjunctival sac three or four times daily. The conjunctival sacs should be cleansed with a solution of boric acid sufficiently frequently to keep them free from secretion. In addition to this, the urethritis or vaginitis that may exist must also be treated.

The results after treatment of this kind in gonorrheal ophthalmia occurring in children are almost always satisfactory. Corneal ulceration may be obviated in perhaps 95 per cent. of the cases.

In diphtheria of the conjunctiva the treatment is altogether different, and consists in the early administration of diphtheria antitoxin in sufficiently large dose and sufficiently often repeated to cause the membrane to disappear and to bring about rapid amelioration of the symptoms. In addition to the use of antitoxin, cold applications may be made for two hours at a time with intervals of one hour during the acute stage, should they prove agreeable to the patient; they will have little influence on the course of the disease. The eyes should be cleansed frequently by means of boric acid solution. Accompanying nasal or faucial diphtheria should, of course, receive attention.

In diphtheria of the conjunctiva the results depend entirely on the stage of the disease at the time of commencement of treatment. When diphtheria of the eye before antitoxin was known caused destruction of the cornea in perhaps 95 per cent. of the cases, it is now possible to prevent any affection of the cornea in almost if not quite all of the cases by the proper use

of antitoxin, provided the patient comes under observation before the cornea is involved. If ulcer of the cornea is already present its progress may be arrested within twelve or twenty-four hours, and the damage done can be materially limited.

FOREIGN NEWS AND ABSTRACTS.

EDITED BY AMÉDÉE GRANGER, M. D.

ADDRESS MADE BY DR. J. RIVIERE, PRESIDENT OF
THE INTERNATIONAL MEDICAL ASSOCIATION
TO ASSIST IN THE SUPPRESSION OF WAR—
AT THE FIRST ANNUAL GENERAL ASSEMBLY
OF THE ASSOCIATION, MARCH 21, 1906.

MY DEAR CONFRERES:

To-day, exactly one year ago, medical men formed a league against war. In fact the title which they first chose, was "International Medical Association Against War." And it was under this name that the day after the massacres at Mukden the entire world learned through the powerful voice of the press that the medical fraternity had uttered by its vehement protest the cry of its profound indignation.

We all know that humanity is yet far from having freed itself entirely from the beliefs of antiquity. If the god Mars is not adored in ancient style, his dogma is nevertheless still deeply rooted in the cranium of the nation.

How else explain this peculiar mentality which makes that even women, in general, whose hearts are full of affection and pity, have not yet trained themselves to think that war should be abolished?

We had not lost sight of the fact that side by side with this atavism numerous elements of society subsist upon the error which the powerful ones turn to their advantage. We knew the obstacles which had to be overcome and it is because we had measured these that we desired to give to our work, from the start, a considerable impulse.

With this object in view, at the same time that the general public in each country was being informed of our professional protest, we, through our official organ, sowed the seed upon the soil where it would bear fruit more rapidly.

I am of those who believe in the power of a just thought, when expressed at the proper time and place.

The breath of truth is as contagious as that of error. I am convinced that if during the last twelve months we witness a real upheaval of human thoughts, it was because two opposite currents were counteracting one another.

We flatter ourselves with having never doubted the final triumphs of reason and common sense. International disputes brought before a properly constituted and accredited tribunal,

whose actions would be known of all, would in reality be judged by public opinion.

And there is no governing power to-day which can go ahead against the general opinion.

FIRST GENERAL ANNUAL SESSION OF THE INTERNATIONAL MEDICAL ASSOCIATION TO ASSIST IN THE SUPPRESSION OF WARFARE.

At the first general session, held March 21, 1906, at the home of the association, 26 Mathurin Street, Paris, under the Presidency of Dr. J. A. Riviere, numerous medical men of all nationalities voted the following resolutions:

1st. That in the future, all international disputes be settled by two properly constituted and accredited tribunals (the International Tribunal and the Humanitarian Tribunal), and that a majority of votes will suffice to sanction a judgment.

2d. That in the Twentieth Century a generous spirit of human good will be substituted for the hatred of race, religion and classes.

3d. That force should not intervene, in any manner, the natural groupings which form themselves into society.

4th. That the good counsel which characterizes the strength of individual acts find its application in the family, in society, as well as in the nation.

Anarchy is to the nation what disease is to the individual.

Social reforms have never resulted from either antagonism or force, wherever used, but only from the good will of all, assisted by reason or common sense.

The Assembly is happy to note the series of significant events which happened during the past year.

Cordial and peaceful relations have affirmed the soundness of the principle; and spontaneous outbursts, inspired by the most disinterested and truly humane sentiments, came during the last few days from those who at the actual hour are the highest exponents of worldly authority.

Treatment of Alopecia by High Frequency Currents.

Dr. Vassilides had fourteen cases of alopecia under treatment in his institution. Two out of the fourteen patients presented the most severe symptoms of the disease. The first case had been afflicted since eleven years, and for the past ten years there was not a hair on his head, in spite of the numerous treatments (medicinal) which he had followed. The second case, that of a young girl of sixteen, witnessed her head become absolutely bald within a few months, and had been that way for three years.

After treating these fourteen patients, the doctor believes that he is justified in stating "that alopecia is always curable by the

currents of high-frequency, derived from the glass electrode of Dr. Oudin attached to the extremity of the solenoid of high frequency.

"The rapidity of the cure depends upon the extent of the bald patches; and the most rapid process, that by which we attempt to cause a mild irritation until a slight vaso-motor reaction becomes manifested, is precisely the one which the patients stand best."

The author employs a Tesla coil and regulates the spark gap and strength of the current so that, when the glass electrode is removed from the skin, sparks of one, to one and a half centimetres in length pass from the electrode. He moves the latter over the affected spots, sometimes touching the skin, again withdrawing from it until he has caused a slight irritation, which will permit of making five or six seances a week.

Mild cases can be cured by this process in less than one month. There are, however, some refractive cases when the first down may only appear after one or two months of treatment. The first patient reported was cured after sixteen months of treatment and the second one after nine months.

In two cases of alopecia, one of the beard, the other of the scalp—besides the bald areas, there were areas covered with white hair. By the same process the color of the hair was changed to one of darker hue, but he made the observation that in both of those cases it took twice as long to restore the color to the white spots as to cure the bald ones.—Archives d'Electricité Médicale, February 10, 1906.

The Fluorescence of Gases Near Radio-Active Substances.—

Translated by Henry Richter.

J. Stark, of Goettingen, contributes the following article on the above subject to the "Jahrbuch der Radioaktivitat und Elektronik," Leipzig, Vol. II, No. 2.

The following working hypothesis may be established concerning the origin of the linear and band spectra of gases: (1) The emission of the band spectrum occurs on the reunion of remnant positive atoms with negative elementary quantities, the mutual potential energy of the charged united particles being covered wholly or partially into electro-magnetic radiating energy. The carriers of the linear spectrum are the positive atom ions, which effect an emission upon collusion with other particles in consequence of the thermic motion within the gas. Given a constant number of reunions in a time unit, the intensity of the band spectrum is independent of the median temperature; that of the linear spectrum is very small at low temperature, but rapidly increases with a rising temperature.

This hypothesis admits of the following conclusions: Assuming that ionization and reunion occur in a gas, the latter

should produce the emission of the band spectrum independently of the kind of ionizator. Through the agency of rays emanating from a radioactive substance, especially the highly absorbable alpha-rays, the gas becomes ionized in the immediate vicinity of the substance and must therefore send forth light from this point. The spectro-analytical examination of this light should show the preponderance of the band spectrum. The stronger the ionization of the gas, the more intense should be the light, and where there is considerable ionization, even the human eye should perceive the glowing of the gases near radio-active substances.

As a matter of fact, Sir William and Lady Huggins (2) have observed that a strong radium preparation surrounded by air is coated with a faintly fluorescent stratum. Upon analyzing the same both spectroscopically and spectrographically, they found the band spectrum of air: nitrogen. Again, Marckwald and Herrmann (3) recently demonstrated by the aid of photographic plates that air in the vicinity of strong preparations of radio-tellurium emanates light, although the luminary intensity in this case was not sufficiently large to be perceived by the eye.

Considering that according to our theory the fluorescent power is contained within the gas, its intensity in a volume unit should decrease, if the pressure of the gas, and thereby the absorption of the ionizing rays and the number of reunions are diminished. Indeed, W. Crookes and J. Dewar (4) were able to verify the fact that in a vacuum no such fluorescence in the vicinity of radium compositions is noticeable. Similarly, Marckwald and Herrmann found that a reduction of the pressure to about 20 mm. considerably weakens the photographically demonstrable glowing of the air near radio-tellurium.

Our working hypothesis admits of still further conclusions, which, however, have not as yet been tested experimentally. The spectrum of the fluorescent light in a gaseous atmosphere around a radio-active substance should always be that of the gas in question. Again, if at a constant density the median temperature of the weakly fluorescent gas near a radio-active substance is increased above that of red heat, the gas near the radio-active substance should increase the intensity of the linear spectrum, owing to the presence of positive atom ions. In the absence of the ionizing substance, which means in the absence of positive atom ions, the gas, although heated to the same temperature, will not emit the linear spectrum.

Inasmuch as the emission of the band and linear spectra of a gas is solely dependent upon the gas ions, all the foregoing conclusions must also hold good in the case that the gas is not ionized by the rays of radio-active substances, but also by other ionizators, as for instance ultra-violet or X-rays. The only difference in the latter case would be that the intensity of the flu-

orescence in the ionized gas will be very small, corresponding to the very low degree of ionization.

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BOOK REVIEWS.

MODERN PHYSIO-THERAPY. A System of Drugless Therapeutic Methods, Including a Chapter on X-ray Diagnosis. By OTTO JUETTNER, A. M., Sc. M., M. D., M. E., Ph. D., Professor of Practice at the Cincinnati Post Graduate School of Physiological Therapeutics, Associate Editor Journal of Physical Therapy and International Journal of Therapy, Member Roentgen Society, London, Eng., etc. etc. Harvey Publishing Co., Cincinnati, O. Price, cloth, \$6 00 net.

The author has been handicapped in his endeavor to include a subject so vast as that of "Modern Physio-therapy" in one volume, which is necessarily at the expense of detail.

The volume is divided into two sections. Part I treats of the Principle of Physiological Therapeutics. In the first chapter he considers the philosophy of the subject of the Section in a popular and convincing style, which from the point of view of the employment of energetic measures contrasts favorably with drug medication.

He does not find the uses of electricity and the X-ray to be on the "same plane of scientific exactness" as hydrotherapy, phototherapy, mechanotherapy, and thermotherapy, in which many authorities are apt to take issue with the writer. This view will account for the greater prominence given to the others, particularly hydrotherapy, in the body of the work. He has unfortunately fallen into the error of considering the static currents as flowing over the skin; saying that "It is the skin which is the real conductor, not the nerves or any other structure of the body." On this hypothesis the static currents would occupy the field of speculation he allots to them.

The chapter on X-ray diagnosis is up to date and shows the writer to be a master of the art.

Section II is devoted to a Therapeutic index, in which the writer has arranged alphabetically diseases and their treatment.

The work is the result of a large experience in the use of Physical measures and will be read with interest by those familiar with the subject, and prove a valuable addition to the library of those who wish to investigate the field of modern therapeutics.

THE INTERNATIONAL MEDICAL ANNUAL: A Year Book of Treatment and Practitioner's Index. 1906, Twenty-fourth year. New York: E. B. Treat & Co., 241-243 West 23d Street. Price, \$3.00 net.

This annual appears this time a little later than usual, owing to a fire, which destroyed copy in type and much manuscript.

Part I devotes 80 pages to therapeutics, and Part II gives a dictionary of treatment, a review of medical and surgical progress. The work is prepared according to the general drift of thought of the progressive surgeon, and the medical practitioner who has given no attention to the progressive advanced field of physical therapeutics. Writers upon these subjects have been generally ignored and the subject generally treated with indifference, which may be no reflection to the publication, but better serves as an index of professional inaptitude and lethargy. The methods at the present time employed in the treatment of traumatic, inflammatory, and functional conditions as marked in all works of this kind are an index of the general neglect of a virile therapeutics. From the other point of view—the popular point of view—the work is representative and will be useful in helping to define the present status.

The work is well bound, has a good index, and will be appreciated by those who wish to investigate surgical progress and drug therapeutics.

ON THE RELATIONS OF DISEASES OF THE SKIN TO INTERNAL DISORDERS. With Observation on Diet, Hygiene and General Therapeutics. By L. DUNCAN BULKLEY, A. M., M. D., Physician to the New York Skin and Cancer Hospital; Consulting Physician to the New York Hospital; Consulting Dermatologist to the Randall's Island Hospital, to the Manhattan Eye and Ear Hospital, and to the Hospital for Ruptured and Crippled. New York: Rebman Company, 1123 Broadway, 1906. London: Rebman (Limited), 129 Shaftesbury Avenue.

The author has in this small volume given the profession a work that will find a place in medical literature that will meet a demand from both the general practitioner and specialist.

The relation of diseases of the skin to internal conditions has been ably treated by the author, whose long experience and familiarity with the subject has well fitted him for the task.

A strong feature of the work is that it is not burdened with references and quotations, but is the expression of the writer's own observation,—the only justification for book-writing.

The work covers the broad field of derangements, particularly those associated with digestive, nervous, respiratory, circulatory, and sexual disorder, and closes with a consideration of anemia, malaria and syphilis.

In the concluding lecture he considers the therapeutics, devoting particular attention to diet, and other hygienic régime, including occupation, rest, clothing, exercise, massage, bathing, etc. Several pages are devoted to general therapeutics.

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No. 7.

THE DOUBLE VALVE TUBE RECTIFIER.

BY ALBERT C. GEYSER, M. D., NEW YORK,

Clinical Instructor in Radiography and Radiotherapy at Cornell University Medical College; Member American Medical Association, American Electro-Therapeutic Association, New York State Medical Association, Harlem Medical Association, Medical Society of the Borough of the Bronx, Medical Society of Greater New York, Manhattan Dermatological Society, etc.

Nearly seventy-five per cent. of all X-ray operators avail themselves of the use of a properly constructed coil in preference to the time-honored static machine.

It is therefore not surprising that more energy has been devoted to the perfection of the output of a coil, than to the output of the static machine; besides the static machine has not differed in any material point of construction during the past fifteen to twenty years.

We must, however, bear in mind that for the production of the X-ray we require primarily a current of high potential. This high potential current the static machine furnishes and what is of equal importance it is unidirectional.

The question of amperage is of secondary importance, however not to be underestimated. The X-ray then is the result of at least three important factors, a current of high potential, unidirectional, and of sufficient amperage.

The static machine can furnish but two of these factors—the high potency and the unidirection of the current—being sadly lacking in amperage.

In the coil on the contrary we have all three of these factors present, as will be shown later.

When a properly exhausted X-ray tube is connected in the circuit of a static machine, and the machine set in motion, we have the means of producing the X-ray that seems to possess all the necessary qualifications for the work for which it is intended. It lacks, however, amperage which would improve the quality of the ray. Static machines have been built with

a view to increasing this not absolutely necessary but very desirable quality. The size of the plates have been increased until they have reached five feet in diameter; the speed has been increased from 300 revolutions to 3000 per min., the number of revolving plates have been increased almost without limit, so that we now have in Cornell Medical College a static machine with forty revolving plates, yet with all these changes, that third required factor—amperage—is still wanting. In the X-ray coil on the other hand we have the high potency and the amperage, but we have not the unidirection of the current under all conditions. In this particular the coil has so far shown its greatest deficiency. The current emanating from a secondary winding is by necessity an induced current. Each time that the interrupter makes or breaks the primary current, an induced current reversing its polarity with each make and break of the primary, is set up in the secondary.

This induced current is therefore an alternating current, but the current which results upon the breaking of the primary is several times stronger than the one formed upon the making, so that there results a decided preponderance of polarity at the break, hence the general polar effect in the X-ray tube.

X-ray tubes of the present day are all more or less constructed upon some general principles. They are spherical when made of flint glass or assume various shapes when made of a combination of lead with flint glass windows.

The vacuum reaches about the same degree, yet some tubes are supplied with devices for raising or lowering the vacuum at will. The cathode or negative pole is always concaved, saucer-shaped, the concavity of this saucer being relative to its distance from the anode, so that the current or stream of electrified gases or particles which emanate from the cathode, sometimes called the "cathode stream" will form a cone, the base of which conforms to the margin of the saucer-shaped cathode, and the apex of the cone strikes the platinum target—the anode, which is placed at such an angle in the tube that the reflections which take place from this target strike the inner surface of the glass tube upon one side only, so that we have emanating from this surface the X-rays of Roentgen.

The modern coils are capable of giving an enormous voltage. The coil in use at my clinic in Cornell Medical College fre-

quently consumes from five to twenty amperes. While we appreciate that the current produced at the break of the primary is the current which furnishes the X-ray effect, we are only too often reminded of the fact that the current produced at the make of the primary has a very deleterious effect upon the X-ray, causing a flickering or unsteadiness of the radiations.

The reverse currents which are so generated in the tube by the back E. M. F. interfere with the proper focusing of the tube; not only that, they produce a large number of secondary rays on the outside of the tube so that the radiograph as a result is flat and devoid of all sharp outlines.

Two years ago Cornell Medical College spent two hundred and fifty dollars for a compression apparatus, hoping by this means to be enabled to cut out these secondary rays. To a certain degree this was possible, but it remained for the French to bring out a *valve tube* that acted as a rectifier of the induced current. When a valve tube is connected in series with the X-ray tube from a coil apparatus, the current flows in one direction only and no reverse E. M. F. is noticeable, so that we may now have from a coil a current of high electromotive force, large range of amperage and a unidirectional current.

These three factors are the principal requisites for radiography and radio-therapy.

It was, however, apparent that something was yet lacking, the valve tube as originally constructed in France did not hold back all of the inverse currents, especially when working, as we do in America, with very heavy currents. Some changes became necessary and finally two such tubes were connected so that one modified valve tube was placed in series at either end of the X-ray tube, and when finally the proper degree of vacuum was reached some very interesting phenomena resulted.

In testing an ordinary Geissler tube it was observed that a single tube connected in series would cut out about 75 per cent. of all the inverse current so that the negative end would appear as a blue halo surrounding the metal terminal, while the positive would have a very much smaller red halo about its terminal, showing a very much improved polar effect. When, however, the two tubes were connected in such a manner that one was at either end of the Geissler terminal, then the nega-

tive end of the Geissler tube became intensely blue and filled with blue luminous rays, while the positive simply showed one bright red point at the very end of its terminal, no halo or other manifestation of the presence of any current whatsoever.

Experiments were then made upon X-ray tubes and the most perfect results obtained. In front of the target a very bright rich green color, with a sharp line of demarcation appears, while the back of the tube is almost black. The current can be crowded until the tube appears as it were at the bursting point with its brilliancy. The bones of the hand can be distinctly seen twenty feet from the target. Any degree of brilliancy or penetration can be had by simply increasing or decreasing the amperage in the primary. Never before did I realize so much the importance of a variable induction in the primary coil, by allowing the amperage to remain fixed, but changing the induction points to their various tappings, all degrees of variation could be induced in the tube. One induction would show the bones absolutely black with a brilliant light between the fingers, while the next change (the amperage remaining unchanged), would heat the target red and the bones of the hand become as transparent as the flesh.

While making some of these various tests, after cutting out the current, it was noticed that there remained in and around the tube, especially when one terminal was grounded, an unusual amount of residual or static discharge. In fact, when the crown electrode was substituted for the X-ray tube and connected with one terminal of the double valve tube rectifier, while the other terminal was grounded, a distinct breeze was felt, not unlike a static breeze. This was interesting,—the question arose, had we discovered a heretofore unknown current, or was it possible that the X-ray coil by this arrangement possessed the property of static machine currents?

Now my attention was turned to this new phenomenon, and all the various currents so near and dear to the static machine seemed to be reproduced from an X-ray coil.

To prove, however, that these currents were either identical or at least similar was the next step.

It is well known that a static machine when left standing with the pole pieces closed for several days discharges itself, and all static operators know that on damp or humid days it

is sometimes very difficult, if not entirely impossible, to generate enough current upon the charger to start the machine into action.

No other current can, of course, be used excepting one from a static machine of some kind, for the same current that comes out of the machine must be used in exciting it into action.

If now the current from the induction coil contained apparently all the principles of the static machine, it should then also be able to impart the initial charge to the static machine.

The static machine was, therefore, started into action to make sure that it was in a state of discharge. The terminals of the double valve tube rectifier were connected to the two sliding rods of the static machine, the coil circuit was closed and the sparks allowed to play between the sliding rods. The static machine was started and without the loss of a moment picked up the current furnished and the static machine was charged from an induction coil, proving that the alternating current from an induction apparatus, after passing through the double valve tube rectifier, possessed the unidirectional properties of the static machine currents.

The current from a static machine is a direct, continuous, or constant current of high electromotive force, other conditions being equal.

This current then has been reproduced by the modern induction coil, and hereafter, when the static machine refuses to work, can either be immediately charged by a powerful charger that never refuses to work, or in place of its utter refusal, may find itself substituted by another and more willing servant.

We have known for a long time that the X-rays from a static machine were very much less liable to produce burns. I believe the solution of that is found in the fact that the current from this machine is in the first place unidirectional and secondly of low amperage.

Since the new properties of the coil currents thus produced were discovered I have been treating all my skin cases, such as lupus, epithelioma, sycosis, etc., with the rectified coil current and I found that burns became practically a thing of the past, in spite of the fact that I now treat all skin lesions for local X-ray effect only by applying the tube as close as possible to the lesion. The results from this new technique are surprising; a new impetus has been given to radiotherapy. During the past year I have treated at my clinic and private practice a large number of chronic skin lesions, the results in nearly every case have been very gratifying. I believe I am safe in saying that the day of scientific radiotherapy is approaching.

1239 Madison Ave.

THE COSMETIC VALUE OF ELECTRICITY.*

BY LAURA VIOLA GUSTIN-MACKIE, M. D., ATTLEBORO, MASS.

(Concluded from page 298.)

CASE I.—Miss M. W., aged sixteen. Brought to me by her mother because of capricious temper, hysterical attacks and other nervous symptoms, that had developed during a year or two. She was moody, self-conscious, shunning her companions, and wishing to leave school in which she took high rank as a student. She was tall, well-formed, and presented no appearance of ill health excepting a most disfiguring acne which covered her cheeks, nose and forehead. Every stage of the disease was present and deep pitted scars where other lesions had been. A careful examination failed to discover any disease which would account for her nervous symptoms, as all her habits were regular, and her social condition of the best. Treatment consisted of local applications as outlined in the foregoing pages with the addition of mechanical vibration and an occasional Turkish bath. The treatment extended over five months and at the end, this repulsive and unattractive girl was converted into a very pleasing and pretty one. Every trace of the hysteria and moody temper vanished, her school work was a pleasure and she became a leader among her companions.

Acne rosacea.—A. B., aged forty-four. The skin of the very high forehead was swollen, glistening and scarlet, dotted with numerous large indurated pustules; the disease being of long standing. The patient's appearance was so repulsive that he had not for years attended any social function where he would have to remove his hat.

Covering the alæ nasi and radiating to the cheeks were enlarged and tortuous blood vessels which added to his disfigurement. Treatment in this case was conducted as above, with internal medication for elimination, and regulation of metabolic processes, which were greatly disordered. The static breeze, following the preliminary treatment by electrolysis and cataphoresis, cured this case in two months. Seen two years

* Read at the Fifteenth Annual Meeting of the American Electro-Therapeutic Association, September 20, 1905.

after, he had remained well. All cases do not progress so rapidly or satisfactorily.

Eczema (chronic).—C. S., American, eruption on scalp, neck and behind the ears. Face was swollen and erythematous, the pruritus intense. There were fissures about the alæ nasi and corners of the mouth and scales covered the clothing like meal. The patient was unable to obtain employment on account of repulsive appearance and was ostracized socially. Being an intelligent young man, he felt his position keenly, more from a cosmetic standpoint than from the suffering occasioned. An eight-week course of static treatment, local and general, so improved the eczematous condition, that he applied for and passed a civil service examination for a position in the Post-office Department. Whenever the slightest trace of his old enemy made its appearance, he presented himself for treatment and by so doing has for several years prevented a relapse.

Eczema sclerosum.—Patient, a woman, aged seventy years, who had previously suffered from repeated attacks of eczema on various parts of her body, but for some years had not found it troublesome with the exception of the lesions on her face. Some five years before, she noticed a small papule on her forehead, soon followed by another on her nose and a third on her right temple. The only symptoms being some stinging and smarting she gave them little thought. From these foci, the patches steadily increased until they were the size of a nickel. They were covered with a thick and hard brownish crust which made a very unsightly appearance. Some little friction would remove the crusts, revealing a moist papular surface underneath, which gradually developed until the same condition as before obtained. She had vainly attempted a cure with lotions, ointments, etc. When I first saw her, she was suffering from uricacidemia and treatment was directed to its elimination. To this end, general nutritional treatment with the static machine was administered, with applications of the continuous current to the affected parts of the face, previously removing the crusts. Tonics and alteratives were also given a trial with little change in the local trouble, although the general condition was improved. Urea was eliminated in the normal amount and the uric acid disappeared. As a last resort, I inserted a small needle attached to the positive pole of the continuous current

of six ma. Getting below the rete mucosum with the needle, the diseased spots were entirely surrounded. Eight treatments were successful in causing sufficient ulceration below the crust to induce a new and healthy cell formation which has continued until the present time. The resulting ulceration was slow in healing but left only a faint scar where it had been.

A case of Alibert's or spurious keloid. A. W., aged fourteen years. Patient was thin, anemic and somewhat stupid in appearance. Her mother brought her for treatment for nervousness and general debility. The girl's head was drawn slightly forward and to the left side, by a cicatrix which had the appearance on casual observation, of a rather recent burn. A more careful examination and with the history of an accident from scalding, when two years of age, showed the mistake. From the angle of the jaw, radiating for two or three inches, were many red patches and nodules, giving an appearance of excessive granulation. On the breast, and spreading out in a fan-shaped manner, were many more of these projections. The nodules were well defined, somewhat firm to the touch, seeming to spring like mushrooms from the cicatricial tissue. They were tender to manipulation and were the seat of great irritation from the pressure of clothing and an intolerable itching. It seemed from the history, that this condition had gradually increased, and the mother, ignorant of the nature of the trouble, ascribed it to the somewhat delayed menstrual function. Treatment was by eliminants, tonics and static treatment. Local applications of various sorts faithfully applied, were of absolutely no benefit in relieving symptoms. Later, she was taken to a skin specialist who pronounced the case one of Alibert's keloid and said that a cure was impossible. With little hope of effecting a cure, but for the relief of the distressing symptoms, the following treatment was begun. Making the parts as aseptic as possible a medium-sized needle, No. 9, was introduced underneath the primary cicatricial tissue until the base of each individual keloid had been encircled. Owing to the nervous condition of the patient, the séances were of variable length, often not more than ten minutes in duration, the current strength only five ma. After a short time she grew accustomed to the process and we increased our current to eight ma. and extended the time of treatment. To our pleasure, we discovered

progress, for the portions that were first treated began to shrivel and drop off, but left a hard base of much brighter color than the adjoining parts. I was granted permission to anesthetize the patient and so was enabled to use a much stronger current. I found a larger needle (No. 1) served this purpose better and a current of thirty ma., which was used as above, resulted in producing considerable ulceration, but when healed did not leave the red base as the less destructive current had done. The treatments extended over many months, for owing to the nervous condition of the girl, we waited for one part to heal before beginning another. These intervals, I now think were unnecessary. General and systemic treatments were kept up at the same time and in twelve months she was discharged, cured. Her whole appearance was changed. She had gained in flesh and spirits and became anxious to improve her mental as well as physical condition. The process was tedious and protracted but the ultimate result was most satisfactory, and now after six years, she is a happy wife and mother.

Trichophytosis.—Patient, a little girl six years of age came with a patch one inch in diameter on the chin. Three applications of the positive pole of the continuous current on alternate days resulted in a cure without other treatment.

CASE II.—A child of eight years contracted trichophytosis. There were patches on face and both lower limbs. She had treatment by various local applications for several weeks without improvement, the disease spread and new patches appeared. After thoroughly cleansing the parts with alcohol, a positive application of ten to twenty ma. was made on alternate days, the parts being carefully dressed with antiseptics between treatments. Eleven applications were all that were needed.

We are frequently consulted by our patients for relief from two conditions entirely opposite in their manifestations. Each is the cause of great annoyance. The deformity caused by them so affecting the mentality of nervous women that various complex psychological symptoms often result—in some instances entirely out of proportion to the disfigurement. I refer to alopecia and hypertrichosis. By the removal of the last named blemish, I have seen a self-conscious, depressed and hysterical woman, converted into a bright, attractive and brilliant one, an ornament to the society she had previously avoided.

I have never seen greater energy or perseverance exhibited or more patient endurance of pain than by a woman in pursuit of this object. No expense or inconvenience is too great if the end is attained. I do not think we should look with contempt upon or belittle the sufferings of these persons, many of whom are morbidly sensitive to adverse criticism and who feel themselves the object of pity from their own sex and of repulsion to the other.

The following case in illustration is reported because of the unusual extent and thickness of the growth and the striking result:

Mrs. H. L., American, aged thirty-five. The mother of two children. She was a very plethoric brunette. An artist of no mean ability, and possessed of a nature attuned to all that was beautiful, with every opportunity to enjoy life she was made wretched by her unusual personal appearance. As a young woman she had shown a tendency to development of this growth but not in a degree to cause her apprehension until after the birth of her two children. She then began to put on flesh, the skin grew coarse in texture and it seemed as though each individual hair became prominent, dark in color, stiff and most abundant on upper lip, sides of face and especially on the chin where it grew long and fast. She began removing the hair with tweezers and to this she attributes the rapid development, with how much truth I am not prepared to say.

Using a fine irido-platinum needle, attached to the negative pole of the continuous current, four to six ma., we began treatment, removing all hairs that were sufficiently long to be seized by forceps. Daily séances of an hour each for some weeks were given before there was any noticeable decrease in number. Allowing intervals for new growth we continued with more or less regularity for three years, when it seemed safe to make a halt. At this time there were numerous red points and some scars but few follicles that showed signs of further development. By an occasional treatment during the next year her face was kept clear, and I lost sight of her for five years, when one day she came to see me. I could hardly believe that this was the same woman. Radiant with happiness, her face was comely and good to look upon and she told me there had been no recurrence. I have known many women far less grateful after a recovery

from a laparotomy than this one whose life had never been endangered.

Alopecia.—The more common varieties of this disease are due to general diseases, acute or chronic, to the various constitutional taints, sex, age and occupation and are amenable in a greater degree to general therapeutics than neurotic alopecia and alopecia areata which are the two varieties that come more frequently to the electro-therapist for treatment. Neurotic alopecia is a rare affection. "The general and complete form is seldom seen." In almost every case a severe nervous shock, in a constitution already weakened by long illness, precedes it. The partial variety is more common and "occurs in the area of distribution of an injured nerve."

"Alopecia areata may also be due to shock, worry, overwork, or traumatism, constitutional disease or any factor that exhausts the nervous system."—"The neurotic theory of alopecia areata is held by many dermatologists."—"It is also recognized in a majority of cases as due to contagion."—"There is a close relationship between tinea tonsurans and alopecia."—Prolonged exposure to the action of the X-ray has been responsible for its occurrence in some cases.

Treatment consists of the application of from five to ten ma. negative applications of the continuous current to the affected spot and is continued until marked hyperemia ensues. Daily treatments, assisted by such other methods as may be indicated, greatly hasten the amelioration and in cases of not too long standing, the prognosis is favorable.—In the high frequency current, we have a powerful adjuvant either as a general or local application.—No method of treatment will prove satisfactory in those cases where the hair follicle has been destroyed.

A case illustrating this variety is that of a young woman, a student, of very nervous temperament. While taking her final examinations for a degree, and greatly excited for fear of failure, one day on leaving the classroom she was attacked with vertigo. Though not losing consciousness, she fell, striking heavily on a bench, and received a cut over the left eye. The cut healed with ordinary rapidity but she felt for some time after, a peculiar numbness in the temporal region and as she expressed it, a wooden feeling to the brow when she moved the muscles of that side of the face. She discovered in a few

weeks that the hair from the affected brow was falling, and that a place the size of a silver half-dollar was being denuded on the scalp, just above the temple on the same side. Much disturbed, she consulted her family physician, who prescribed for her but without benefit, for the hair continued to fall, leaving a perfectly smooth surface with only a few short, stiff hairs remaining. In this case the efficiency of electro-therapeutics was proven to the entire satisfaction of all. Thirty treatments were made by the foregoing methods and effects augmented by half-hour daily treatments by static sparks and spray to spine. The crown electrode with local application to the affected areas from the Geissler tube were also used from time to time. Rest out of doors, exercise and freedom from care were enjoined. The recovery was complete and no spread of the alopecia has been noticed.

Other methods and agents, including the X-ray and actinic rays, have their advocates in the diseases just mentioned, and each operator chooses the one which from experience or the evidence of others seems to him the best. I believe we are yet to see even greater results than have been already accomplished along these lines. The list of the minor blemishes is long, and disfiguring conditions are many, in which electricity can be used with a reasonable expectation of benefit. The technique is too familiar to make it worthy of consideration at this time. Its cosmetic value is fully recognized by all who have had actual experience in its use. But I wish to emphasize the importance of successful treatment of these minor blemishes.

Discussion.

Dr. Tousey: The treatment of small epitheliomata and warts by means of the high frequency current is often successful after one, two or three applications of the red spark from a metallic electrode, a fact to which I desire to call particular attention as a matter of technique. This was suggested by Udeng in such cases. He used a current of 100 milliamperes, passing through a metallic electrode, with a straightened handle. He has the apparatus turned on, holding the electrode by the metallic part and taking the patient's hand, so that the patient is full of the charge. He then applies the point to the small growth, or nevus, or superficial disfigurement, so that there

is practically no effect from the electrode, although there is a very slight spark passing from the electrode to the surface of the patient. Then he lets go of the hand, but still holds the metallic part of the electrode in his own hand to the patient's face. Then there is a decided spark, sufficient to make an anesthetic effect on the surface. After this, still holding the contact, he shifts to the insulating plate, so that the patient is receiving the full charge of 100 milliamperes. That produces a very decided effect, but not a painful effect. After three seconds he holds it a little distance away for fifteen or twenty seconds and gives the regular shower of white sparks on the spot. This does not produce necrosis, but a change which causes the nevus, epithelioma or wart to disappear completely. There is a small scar which, however, disappears in two or three months.

Dr. Strong, Boston: I have been very much interested in the remarks of the last speaker, as I was not aware that Udeng had written on the use of the high frequency current for this particular purpose. I have used a similar method in which I apply a Geisler current from a static transformer, and have taught this method to my students for eight years. My technique is very similar to the one described. I apply the point electrode of any metal with one pole to the Tesla apparatus. For those who are not familiar with the Tesla and Udeng methods, I may say that it gives a bipolar current and the discharge is of such a forcible character that it instantly ignites wood and actually produces flame with considerable heat. My technique embodies the metal electrode with one pole of the Tesla apparatus applied to the point at which we wish to produce the cautery effect. By means of a foot-switch the current is applied. No sensation is applied to the seat of action, but by making contact at the end of the electrode and the surface of the patient, an instantly lighted minute arc is produced, owing to the intense oscillation and ionization. There seems to be a peculiar anesthetic effect, so that in treating small growths in this way my patients seldom complain of inconvenience or discomfort, although the result of the operation is a complete local destruction of the growth. Similarly, in ordinary burns extending more deeply, the growths would shrivel up and come off as a small dry crust. I am glad to hear that the method is in use with the Udeng technique, as I can testify to its great value in this class of operation.

USES OF STATIC ELECTRICITY.

BY JOHN A. MOORE, M. D., MILLERTON, N. Y.

The uses of static electricity, while not so numerous as the diseases to which flesh is heir, are certainly of far more value in most chronic and very many acute diseases than any other single means of treatment at our command.

The great handicap to the static electrical current is in not knowing how to use it. Like morphine, strychnine, ether, aconite, and many other drugs, it will either be a dangerous master or a willing and trusty servant: Learn its nature and as far as possible its power before undertaking the treatment of cases.

The above statement is made after having used a ten-plate static "influence" machine for several years, almost daily. I began by trying to use all the electrodes on every case, but soon learned the folly of my ways by seeing some of my patients go to a physician for electrical treatment whose whole outfit consisted of an old-fashioned, four by six inch, old faradic battery, with a single door-bell cell as power. This man says, "Electricity is electricity, and one outfit is just as good as another." My patients are returning to me.

My experience teaches me to say, get a good large static machine, and learn the uses of it in all the different modes of application; learn the use of the Morton wave current and the induced currents from Dr. Snow's and Dr. Monell's writings, and by experiment on yourself also the uses of the vacuum electrodes introduced by Dr. Snow, and others. The static spray, too, has its use, as have also the static breeze, the bath, and the several sparks.

I can illustrate much better the uses of the static by citing a few cases, as they come up in my case book.

Case 1.—Mr. M., farmer, fifty-one years old, of very nervous temperament; uses tobacco almost constantly, liquor moderately. Family history: father troubled for years with asthma; no other member of his family having any chronic disease. Patient began about his twenty-fourth year to have asthma, first for a few hours, with long intervals of rest; soon the paroxysms lasted longer and rests grew shorter, until when I saw him in August, 1903, he was almost a constant sufferer.

He had tried changes of climate, patent medicines and several physicians with only temporary relief. Began treatments by using Morton wave current over the lungs and on the back, using a four by six inch metal plate on the moistened skin, on alternate days, and the contact vacuum electrode every day over the chest. Improvement began from the first treatment, after ten days treatments were given every other day for a month, then twice a week for another month, finally once a week for two months. The spark-gap with the wave current was always as long as the patient would tolerate, from six to eight inches, and length of time of treatments one half hour, including the use of the vacuum tube. No drugs were used. The patient was using some "smoke cure," which he gradually gave up entirely. Result of treatment; patient passed winter without one severe attack and now, after two years, he is still free from severe attacks and has light ones only at long intervals. Last winter was the best he has seen in years.

Case 2.—Mrs. R., age sixty-three; housewife. Family history good, except that the patient was rather nervous. She had always had good health. Married when about thirty, she has had no children. In 1902 she began to suffer from arthritis deformans and was treated for rheumatism, gout, etc., by drugs, blisters and other external applications, until January, 1903, when I first saw her. At this time she was unable to walk or straighten her knees, or use her left hand. Her knees were swollen, the right one measuring 17 1-2 and the left 19 3-4 inches, and were almost immovable. Treatment was begun by using dry hot air with a Betz apparatus. This relieved the pain and in a measure reduced the swelling and gave her some use of the joints, but not enough that the patient could walk. The disease had spread to the elbows, wrists and ankles. This condition continued until October, 1903, when I placed a six plate static machine in her home. The machine was operated by hand, so it was impossible to get a very long spark-gap for the wave-current. The treatment was necessarily, therefore, largely with the induced current. Metal plate electrodes were placed on one large joint and two or more small ones at a time, all moistened. At first the patient could only tolerate treatment for ten or fifteen minutes, but gradually they were extended to half an hour and longer, the pa-

tient lying upon a cot upon insulated platform. This patient made rapid progress from the commencement of the static treatments. As the house was not well arranged, the hot air treatments were discontinued as cold weather came on. Early in November patient walked, unaided, a distance of twelve feet, the first in more than a year. December 1st, patient contracted a severe cold, pneumonia developed and the patient died December 9th. At the time of death patient had not one joint that could not be straightened and moved without causing pain or discomfort; the knees she could straighten unaided. The drug treatment consisted of tonics, nothing more. Had I begun using the static electricity when I did the dry hot air, I am sure the patient would have fully recovered.

Case 3.—Mr. B., age sixty-four years, weight 225 pounds; railroad station agent; family history good; habits good; temperate in all things but work. He has been troubled with "lame back" for years. When patient came to me in October, 1903, was unable to stand up straight or get up from a sitting position without something to help him. Lumbar region swollen and very painful lumbago well marked. Began using Morton wave-current for fifteen minutes with a soft metal electrode six inches square over the lumbar spine, moistened, and employing a spark-gap four to eight inches long as the patient could tolerate. This was followed by small sparks from the point electrode, the patient not bearing the heavier sparks from the ball electrode. Treatments were given every day for one week, then every other day as patient resumed work. After the second week, treatments were administered twice a week for two weeks, since which time patient has had no trouble with his back, and no treatments.

Case 4.—Mrs. E., age twenty-four years; married; no children. Neurasthenic. One ovary had been removed and local treatments given to the uterus for several years. The patient was first seen January, 1904, when she was in a highly nervous condition,—hysterical and sure that she had cancer of the womb. I soon found that even large doses of anodynes had no effect. She had used them and had taken large doses of whiskey, etc., for years. The bowels were constipated, appetite poor and patient anemic. On January 16th the patient came to my office for her first treatment. I introduced a Snow vacuum vaginal electrode well up and under uterus and placed a soft metal electrode at the back of the neck, using the static induced current, as strong as the patient would tolerate for fifteen minutes, then removing electrode from neck, and taking off the jars, I used the wave current in vagina for fifteen minutes. The treatment was kept up for ten days, until the menstruation came

on, which was almost free from pain for the first time in her life. After the menstruation period passed treatments were resumed every other day, same as before, except that every other treatment was given per rectum with a vacuum tube, this to overcome the constipation as well as to apply treatment to upper back part of uterus and the remaining ovary. At the next menstrual period the patient was but little indisposed and kept up during the whole time, for the first time in years. Treatments were given twice a week for two months longer. Patient was discharged cured, has had no return of her trouble. The only drugs used were for a time the pill triple valerianates and cascara sagrada.

Case 5.—Mrs. C., age forty; slight; very active, working hard in a grocery store; is married, and has one child twenty years old. Came to me in August, 1904, suffering from indigestion. Found stomach dilated and bowels flatulent. Patient vomited at nearly every meal; was very much emaciated, weak, nervous and as she expressed it, "used up." I began using the wave current over the stomach and gall bladder. This case illustrated plainly that the moistened skin is much better than the dry skin under the metal plate. I applied the plate dry at first, but found that the patient could not tolerate more than a two-inch spark-gap, owing to a scaly skin trouble; when the skin was moistened, a six or eight-inch gap could be used. Treatments were given every day for two weeks, when the patient was so much improved that she went into the country for three weeks. Improvement began with the second treatment, vomiting stopped, the bowels became regular and the patient began to eat and sleep much better. At the end of the second week the patient began to put on flesh, and during the three weeks in the country gained five pounds. Drugs used were intestinal antiseptics, and nux vomica, and pepsin for stomach, with a few doses of calomel.

The patient resumed treatments every other day upon her return home for about two weeks, then twice a week for two months, and is now entirely well, using no treatment of any nature. She eats and sleeps normally, and is well.

Case 6.—Mrs. H. B., age thirty-six; is married, and has two children. She is a housewife, and family history is good. The patient is very nervous and hysterical, and has considerable pain at each menstrual period. She also suffers from severe headaches and some stomach trouble. She came to me in September, 1903, suffering from erythema of the face, neck, chest, arms and hands. I learned that the skin trouble began with the first menstrual period at about fourteen years of age and had been almost constant since except during pregnancy, when she was free from all rash. Began treatment by using drugs internally and washes externally. As drugs did no good and

not knowing what else to do I took her to a skin specialist, but could get no help from him. I then began treating the nervous condition by using a large metal plate, moistened, over lumbar spine and opening the spark-gap as far as spark would pass. This was repeated every day for three months, except during the menstruation, the result was that the skin cleared up entirely and for months nothing was seen of the erythema, but several months ago the patient became unusually nervous for some reason and the rash came back as severe as ever. Since that time, about January, 1906, I have been unable to check it with the static treatments. At present I am using the "Leucodescent" light in connection with the static and the patient seems to be improving. This is a reflex nervous erythema surely.

Case 7.—Miss W., age twelve years. Family history good. Patient has had many of the diseases of childhood. About four years ago had pneumonia, since which time she has had severe paroxysms of asthma and until a few weeks ago severe coughing spells. The patient came under observation in February, 1906, just after recovering from asthma and still coughing badly. She was pale, anemic, thin, with hectic flushes upon the cheeks. The eyes were dull, and she complained of pains in the upper part of lungs. She was sick at stomach, with no appetite, and the bowels were irregular. The temperature was 100° F. The pulse was 120 per minute, weak and compressible. The voice was weak, and the heart action unsteady, with some moist râles on the left side of chest. The upper part of right lung was thickened, sore and painful. Treatments were begun on February 12th. A thin metal plate was placed over the upper part of the chest, with a two-inch spark-gap for ten minutes; then, as the patient was tired, I separated the connecting rods fully and gave her the static bath. After five minutes the patient was sleeping in the chair on the platform. Treatments were given every other day for about two weeks, then owing to bad weather they were irregular for a month. The patient's lung has cleared up, there is no cough, she eats well, has no hard attacks of asthma, has gained twelve pounds, and the heart is strong and regular. The only medicine used was maltine with cod-liver oil, a simple cough remedy, and a tonic of pepsin, bismuth, and strychnia. Treatments now are given once a week with the thick metal plate and a spark-gap of about six inches.

Case 8.—Mrs. S. B., farmer's wife, age thirty-three years; is married, and has no children, but lost one at eight months, several years ago. Her weight is about 200 pounds. She came to me in March, 1906, suffering from internal hemorrhoids, bleeding and very painful. The rectal vacuum electrode was used, with the wave-current for twenty minutes.

It was necessary to use cocaine at the first treatment before I could introduce the electrode. There were no severe pains after the first treatment. Treatments were given every other day for six days, since which time the patient has had no trouble or pain. The only drug used was a few doses of cascara.

Case 9.—Mr. T., age sixty-five; merchant. Began to notice loss of power to hear low sounds about one year ago, otherwise is in perfect health. He came to me in January, 1906, when I began treating his ears with the vibrator ear massage pump and dry hot air. After treating him every other day for one month, there seemed to be no improvement. He could then only hear a watch held close to either ear. At this time I stopped the dry hot air and began using a vacuum tube from the negative side of the static machine, using as long a spark-gap as possible—about two inches. Since making this change there has been a gradual but steady improvement. He can now hear the watch about three inches away. Treatments are only given about once a week now.

Case 10.—Miss P., age 16 years; schoolgirl until about fifteen years of age; had good health, but trying to do too much work in school unsettled her nervous system, causing back-ache, headache, dizziness, sleeplessness, loss of appetite, constipation and loss of weight; in fact, when she came to me in April, 1905, she was on the verge of nervous breakdown,—neurasthenia. Treatment was begun by using a long metal plate over the spine with the wave-current for fifteen minutes, then putting the crown over her head and separating the connecting rods fully, giving the crown breeze for the same length of time. Improvement began at once and continued. The patient finished her school year with no loss of time. Treatments were given after school, twice a week for about a month, when patient was discharged cured. The only drugs used were a tonic of nux and pepsin.

I might cite many more cases but think the ones given above will show that static electricity, while it has not cured all the cases, has been of more value than any other form of treatment. I find by moistening the skin, when using the wave current, that the patient will tolerate a longer spark-gap from the start. The skin will become moist, usually under the metal electrode, but often the patient will complain of "stinging" at first and become nervous before the part gets warm and moist.

In all my cases I have used the pole most agreeable to the patient, usually the negative pole. Sparks I have not used much, as the Morton wave-current and vacuum electrodes answer all purposes and are more agreeable.

STATIC ELECTRICITY.

BY W. I. M. SMITH, M. D., NACOGDOCHES, TEXAS.

For nearly two hundred years static electricity has been fluctuating in the estimation of both the laity and profession. Within the last decade it has rapidly grown in importance as a remedial agent, until it stands pre-eminent among electrical currents, and now promises to revolutionize the practice of medicine and surgery by substituting the conservative for the more radical and empirical treatment of disease.

The remarkable discovery of Roentgen and the association of this current in the production of the ray crowned it with additional and permanent distinction, but it was Charcot, Morton, Monnell, Snow and others of modern times who developed and evolved from its latent and mysterious resources the present beautiful and definite system of static electro-therapy, and by their superior intelligent endeavor have placed it upon a permanent and scientific basis.

Until recently this current was applied almost exclusively in the treatment of nervous and functional diseases,—now with its many modalities there are but few conditions met in the practice of medicine that cannot be benefited and even cured by it.

All currents derived from a static machine are most conspicuous and distinctive by virtue of the minimum amperage in proportion, or relative to their exceedingly high voltage, and these currents cannot be generated or reproduced by any other machine or device than the static. These not only serve to distinguish it from all other currents, but render it practically harmless of administration and often beneficial even in the hands of the novice or tyro, and those who are devoting time and study to static electro-physiology and therapy, and intelligently applying these modalities in the treatment of disease, are deriving pleasure and profit not obtained from drug therapy alone.

There seems to be no unity of agreement among operators concerning polarity effects in static administration. According to opinions and deductions of some the sphygmomanometer is the key to the most scientific and effective administration of these modalities. Dr. Monnell said until quite recently, that

all static administrations lower arterial tension. Dr. Burch very recently affirms that the disruptive and convective static discharges produce marked rise in arterial tension and apparently without regard to the polarity employed. Whether this is his experience and observation in physiological conditions or in certain pathological, it is not the uniform result in treating disease; and in either the indications are not yet so definite or positive that we can have any guide but clinical experience.

The effects of static administrations as I have observed them are: (1) A general stimulation and improvement of mental and bodily activity and well-being. More natural and refreshing sleep, which is always necessary and essential to improvement and convalescence from all diseases and injuries.

(2) Increased appetite and improved digestion; return of hope, strength and physical endurance.

(3) Stimulation of all emunctories, consequently increased metabolism and urea elimination.

(4) Local effects are numerous according to the modalities used and the condition of the part treated. These effects are purely antizymotic or antiseptic and mechanical.

The local effects of high potential currents from vacuum tubes and the Morton wave current will, or may in the hands of skillful operators, more than duplicate the effects of mechanical vibratory stimulation, and these high potential currents with the brush discharge may relieve all inflammatory and parasitic skin lesions. While the continuous current is no doubt more effective in treatment of angiomas, chloasma, leucoderma, nevi of all kinds, warts, keloid, alopecia and some others, the clinical results may be equally as good in most of them by employment of these modalities. Better results will be obtained in lupus, eczema, seborrheal eczema, or skin cancer, and the acnes and lupus with the aid of some form of radiant energy.

Some cases of general debility, some cachexias, tedious convalescences, neurasthenias and certain anemias may almost always be improved and even restored to normal conditions by static electrification with the breeze or spray; alternating with the direct interrupted or indirect (potential alternation), and often persistency of effort will be rewarded with good results after quite a period of disappointment. As a rule posi-

tive insulation is more adapted to cases in which the indication is to quiet and soothe, and the negative for the induction of the opposite effect.

The polarity effect of Morton wave current on tension varies materially, according to some observations in nephritis and arterio-sclerosis, the positive increasing and negative decreasing. This, however, is not in accordance with general observation and experience.

Without occupying space in this paper or the time of its readers I will conclude without detailing a report of cases by saying that with these modalities at hand, and intelligently utilized, the ineffectiveness and futility of a disappointing drug therapy may be fully compensated.

Second Floor, Blount Building.



HIGH FREQUENCY CURRENTS.

BY EARLE L. OVINGTON.

In the March issue of the Journal there appeared an article by Mr. Monroe S. Clawson entitled, "Induction and So-Called High Frequency Currents." As this subject bears directly upon a subject with which I am in close touch, and as I differ with some of the statements made in the article, I feel called upon to reply through the Journal. I should have replied before, but for the fact that matters of the utmost importance have prevented me from doing so.

Since the publication of the article referred to I have received numerous letters from physicians using high frequency apparatus, asking me to defend certain statements which I have made in my published lectures, which statements are just the reverse of those made by Mr. Clawson. The time has come for the physician to know the truth with regard to the class of currents known as "High Frequency Currents." I believe that the quickest way to arrive at the truth is to encourage discussions between manufacturers or electrical engineers, who know their subject. Each statement and its reply will be in black and white, so that there can be no retreat.

Take Mr. Clawson's first statement: "We note in the medical journals that certain makes of apparatus will generate currents of Oudin, d'Arsonval, and Tesla, besides the oscillatory and static currents. I wish to say at the outset that this is impossible from a single apparatus, and is very misleading to the prospective buyer of an outfit."

In reply to this I refer Mr. Clawson to a paper entitled "The Physics of High Frequency Currents with Special Reference to Their Use in Therapeutics," read by me March 17, 1905, before the Clinical Society of the School of Physical Therapeutics, New York City, and published as a serial in this Journal, beginning with the June, 1905, issue. I have had this and another paper reprinted and would be glad to send Mr. Clawson, or any other interested party, a copy. In this paper I describe how the d'Arsonval, Oudin, and Tesla currents are generated, and it is only necessary to put a cut-off switch between the d'Arsonval and Oudin coil, in Fig. 4 of my paper, to com-

plete the arrangement so that all three currents may be derived from one apparatus. I think everyone who knows anything at all about the subject will readily see how this arrangement gives us the method of obtaining at will either the d'Arsonval, Oudin, or Tesla currents from the one machine.

The very next statement deserves attention and is as follows: "In the first place, the Oudin and d'Arsonval currents are all generated from a 'make and break' continuous current, while the Tesla is generated from a true sine (alternating) current." In reply I shall simply state that the character of the oscillatory wave form of a high frequency current (whether of the d'Arsonval, Oudin, or Tesla type) is practically independent of the character of the source of electrical supply charging condensers of the high frequency circuit, and that under ordinary conditions it makes no difference, as far as the character of the oscillatory current is concerned, whether a "make and break continuous current," or any other form of electrical energy, be used to charge the Leyden jars or other capacity.

I fully agree with the statement that the static current is generated in a different manner and is different in character from a high frequency current, and that at present *all* of the effects of the static machine cannot be reproduced by any other device, but I will say that there is no reason why all such currents cannot ultimately be generated by transforming devices. To say that all such currents never can be produced is putting a limit to human progress that the most advanced thinkers will not countenance.

Differentiating "static effects" from actual "static currents," I will say that many effects produced by the static machine may be reproduced by the properly designed high frequency apparatus, but in justice to the static machine I will say that there are other effects which at present cannot be duplicated by any high frequency apparatus with which I am acquainted. On the other hand there are a very large number of effects that may be produced with a well designed high frequency apparatus that cannot even be approached by the static machine.

With regard to the statement made by Mr. Clawson contrasting the electrical efficiency of the open and closed magnetic circuit transformer, I would refer him to any one of several works treating the induction coil and transformer, but it must

be obvious to anyone that the closed magnetic circuit transformer, with its absence of magnetic leakage and wasteful make and break mechanism, is far more efficient than an induction coil with its large magnetic leakage and inefficient and uncertain break mechanism.

There are certain advantages possessed by each type of apparatus—static machine, induction coil and high frequency apparatus—that are not found in any other type, and it rests with the physician to make a careful investigation of the merits of each device and to choose the one best suited to his needs. Let the manufacturers give detailed descriptions of their apparatus in their advertising literature, and the task of choosing a therapeutic apparatus becomes much easier for the physicians. Far too many manufacturers describe their product in glittering generalities, to the almost total exclusion of information of value to a physician after the truth with regard to electro-therapeutic apparatus.

We manufacturers have one great advantage over our neighbors in many other fields. We deal almost exclusively with customers with well developed reasoning powers. Let our advertising literature bear witness of the fact, and give the physician credit for the ability to think for himself. Let the manufacturer avoid generalities,—let him state facts,—and depend upon the intelligence of the physician to make a proper choice of apparatus.

Editors of medical papers and physicians alike should encourage criticisms such as this one as the surest way of obtaining the truth. In the event of complicated difficulties arising from the discussions, the matter could be referred to a committee of competent electrical engineers for settlement.

Up to the present time many erroneous statements regarding electro-therapeutic apparatus and methods have been made through the medical press and have not been challenged. For the good of all concerned this should not be allowed. If writers upon electrical subjects for the medical press realized that they were open to criticism just as writers for the electrical engineering press are, they might exercise more care in their articles. This would result in raising the standard of the whole subject of electro-therapeutics.

Editorial.

X-RAY DOSAGE IN THERAPEUTICS.

THIS ever interesting topic has received a great deal of attention from our foreign contemporaries and is justly a subject for thoughtful consideration. In determining, however, upon a system of measurement based upon some unit which should be standardized by mutual acceptance, other facts must not be lost sight of with reference to the receiver. The idiosyncrasy of the person thus exposed to X-radiations, while not so variable as was at first supposed, is still a matter calling for prudent thought and recognition. At this time when, under the leadership of Belot and Bordier, the *massive doses* of the X-rays are being urged, the experience of contemporary radio-therapists must be recognized, and the fact that a great difference exists in the dosage that can be borne under the graduated system of intermittent short exposures which forestall the danger associated with the administration of massive doses; the operator having no foreknowledge of the relative resistance of different cases.

In the past, brilliant results have been obtained from the former method, and it is certainly a question of expediency whether the massive dose is not a departure partaking of the heroic to an extent which will prove detrimental, as it has already in many cases. From past experience and observation in a large number of cases successfully treated it has been demonstrated that a great variation in the number of exposures has been necessary under otherwise similar conditions to obtain the same results; and that none of the methods of measurement advocated to the present time have offered a reliable means of determining more than the relative effects of X-radiations upon the same individual. The dosage must, therefore, be regulated to each individual case with a proper degree of caution, remembering that resistance is variable. No method offers the degree of safety necessary, where a massive dose is administered, because it cannot reach its maximum of effect without great danger of overstepping the bounds of safety in any case; and we predict that ultimately little consideration will be given

to massive doses. The method is certain, if generally adopted, to be followed sometimes by serious results in the hands of experts, and so often in the hands of the novice, that it would be certain to bring disrepute upon one of the most valuable methods in modern therapeutics.

A warning is timely, *especially now*, when so many are taking up the employment of an agent fraught with so much danger when injudiciously employed as is the X-ray.

For the beginner then at least, and we believe experience will also bear out the statement for the experienced hand as well, it will be the wisest course to employ the intermittent short exposure of a ray of medium intensity and volume, bearing ever in mind that slight variations in strength will hasten or delay, only in a measure the signal dermatitis, which ever calls a check upon the administrations.

Moderation should be exercised in the advocacy and employment of massive dosage, without which cautious watching with regulated moderate irradiation is the certain course. The recognition of the personal equations, both patient and physician, is of first importance.

* * *

THE THERAPEUTICS OF LIGHT.

NO therapeutic agent appeals more to the physician and layman than that of light, and yet but a vague notion of its indications seems at the present time to have taken hold of the professional mind.

The inquiry of the uninformed is as a rule with reference to the violet and ultra-violet rays, they believing that greatest virtues lay in these rays of highest refrangibility. The published results obtained by Neils Finsen from the employment of these rays in lupus vulgaris is the occasion of the notion that they have particular therapeutic value. On the contrary the luminous rays are of still greater value. The united rays composing white light with the addition of the heat radiations is the condition of light which offers the greatest therapeutic possibilities, except in those peculiar cases adapted to the ultra-violet rays.

The indications for the combined radiations of heat and light include: (1) Those conditions arising from exposure to the

X-ray in which the processes of metabolism have been seriously interfered with; as when sterility or lowered vitality of the tissues has been induced, or when the secretions or other functions have been interfered with; (2) in all conditions of metabolism resulting in impaired activity of the secretions of the skin from any cause, or in Bright's disease in which an active elimination by the other emunctories will relieve the congested kidneys; (3) in rheumatism or gout, in which its effects are undoubtedly superior to those of dry hot air, embracing as it does the combined influences of light and heat upon the functions of metabolism; because the effects of light upon the blood increase the activity of the blood corpuscles, thereby improving the possibilities of oxidation and elimination; (4) in arteriosclerosis and in other conditions in which the heart is working against a degree of high arterial tension—relieving the labor of the heart by dilating the capillaries and smaller arterioles, thereby increasing the circulation in the periphery of the body. For the same reason it is indicated in all septic processes, favoring in a large degree the elimination of the products of infection.

The application of light and heat radiations by the employment of the localizing lamp of approximately five hundred candle power are remarkably efficacious in the treatment of local infections and inflammatory processes. For this purpose the light for local uses projected from the swinging incandescent lamp renders valuable service. The same effects may be derived from the marine searchlight by projection of parallel rays, interrupted by moving the lamp from side to side. These localizing methods meet in a general way the indications of the light bath, having the disadvantage, however, that only one side of the body is exposed, and that the accumulation of heat cannot be retained as within the light cabinet. The light cabinet, therefore, has an advantage in the treatment of rheumatic and gouty affections and nephritis in which a larger degree of elimination is effected by the accumulated heat within the cabinet. The indications for light in therapeutics are of far-reaching importance and worthy of more universal professional recognition than they have received in the past.

Progress in Physical Therapeutics.

CURRENTS OF HIGH FREQUENCY AND HIGH POTENTIAL.

EDITED BY WALTER H. WHITE, M. D.

Ionization by Means of the High Frequency Current in the Treatment of Tuberculosis. By Alfred Goss, M. D., *Medical Record*, June 9, 1906.

After treating to some extent the author's theory of action of the high frequency current the writer describes his method as follows:

"The form of electrode I think is of great importance. I use a vacuum tube for surface application, and instead of having a flat surface, have it concave on the bottom, with a wire extending lengthwise through the tube, and a large disc made concave on the under surface to correspond in shape with the bottom of the glass electrode and suspended about one-half inch from it. By the application of the high frequency current the superficial circulatory apparatus becomes greatly engorged and the patient breaks out in profuse perspiration. This drainage changes the specific gravity of the blood plasma. With this change in specific gravity there should be a rapid absorption of the gases retained under the vacuum electrode. By this means I endeavor to introduce substances into the circulation to take the place of the alexins where they are wanting. To focalize a current when treating the chest, I cover the back with tinfoil connected to a chain which is grounded, and reverse this when treating the back. The machine used is a Van Houten & Ten Bröeck static machine connected with a resonator, devised by Dr. William J. Morton and constructed by Mr. Wilkinson, of the before mentioned firm. This gives me a current of from 250 to 500 milliamperes and about a million and one-half volts. The superiority of the current is in its great pressure, and one does not get the irritating effects upon the skin that are found in using coils such as I have tried. The pressure of the current should be used such that when it is allowed to discharge before a fluoroscope the sensitive screen on the opposite side of the pasteboard from the discharge and within the fluoroscope, will fluoresce. . . .

"The evidence of the penetration of the gases generated by this current is in the fact that the patient detects the taste in what is coughed up and expectorated for from twelve to twenty-four hours following treatment. In evacuations from the bowels it is detected by its odor, when used over the abdo-

men, and when used over the bladder the urine has the characteristic odor."

The writer has through the past three years treated over 200 cases by the method described and correct records have been kept of the one hundred and seventeen cases recorded. There have been thirty-eight absolute recoveries so far, as after repeated examinations they show no tubercle bacilli in the sputum. They regained their weight and run a normal temperature. They have since been living in various sections of the country and still remain well, performing their usual avocations. Seventeen cases were improved, but from various causes discontinued the treatment and are still remaining comparatively well.

Of these, three cases improved or recovered. The following conditions existed: "During the first week there would be an invariable increase in the number of germs present, which would be gradually diminished again, so that by the end of the third week the number of germs would correspond with the number first shown. During this time they would be gradually gaining in weight, and from the end of the third week, the germs would gradually diminish in number."

"In regard to the temperature changes, for the first week a person would get extreme fluctuation, varying from 96 degrees in the morning to 103 degrees in the afternoon, and in exceptional cases dropping even as low as 93 degrees. In these cases before the third week of treatment was finished their temperature would not vary any time within the twenty-four hours to exceed one-half a degree. The physical examination will show, in all these cases within two weeks from the time of commencing treatment, increased breathing capacity and frequently the sputum is slightly stained with blood. This I look upon as a favorable sign. While in the cases that progressed unfavorably one would get a high temperature each afternoon, and although their appetite would generally improve and they would take on a small amount of flesh, this would be of short duration.

"The formula which follows generates a gas which is stated by John Glassford, chemist of Cooper Institute, to be carvocol, a powerful germicide which I think has a special affinity for the tubercle bacilli. The mixture consists of gum camphor and iodine, each 3 ounces, turpentine, 6 ounces, and sulphuric acid, 1 dram.

"None of these cases were in the incipient stage when admitted, the shortest time any patient had been afflicted with this trouble being one year, and the oldest case eight years. . . .

"It goes without saying that good, fresh air, pure food of nutritious kind, and passive exercise is advisable. No forced feeding is given to impair the stomach's functions, and only

such medication as from time to time is demanded by individual cases. Climatic conditions are more than compensated for by this treatment, and the surroundings and comforts of our cities and eastern towns. Good nursing, salt and oil baths, passive exercise that takes the attention and promotes cheerfulness is a great factor that should never be lost sight of. All this together covers the plan I pursue."

STATIC ELECTRICITY.

EDITED BY J. H. BURCH, M. D.

Static Electricity in Therapeutics. Am. Journal of Clinical Medicine.

In a recent communication, Dr. Henry Weston Barnum, of Poughkeepsie, N. Y., reviews in a most concise and painstaking manner the therapeutic indications and methods of application of the various electro-static modalities. Dr. Barnum also reports a series of interesting cases that were relieved and cured by means of the static machine.

Dr. Barnum asserts that the positive pole is more sedative and nutritional in its action. A case of toothache was quickly relieved by means of the positive breeze, as was also a remarkable case of chronic headache of twenty years duration.

In applying the Morton wave current for its tonic effects, Dr. Barnum follows closely the technique of Dr. William Benham Snow, of New York. Malleable metallic electrodes are carefully applied to the affected part that are connected to the positive side of the static machine by means of flexible rheophores, while the negative side of the machine is grounded. The spark-gap is gradually increased to tolerance. For spinal treatment, a long, flexible metallic electrode of 1 x 15 inches is applied over the entire length of the spine. If the patient objects to the noise of this modality, Dr. Barnum advises that bits of cotton be inserted in the ears. By this means, the sound is effectually deadened.

Dr. Barnum asserts that he has successfully treated Bright's disease by means of the Morton wave current. A piece of block tin 3 x 6 inches is applied over the lumbar region that is attached to the positive side of the static machine, while the negative side is grounded. A spark-gap of 8 inches was employed. The séances were daily. After a period of eight months one case showed but little signs of the disease.

Dr. Barnum has achieved signal triumphs in the treatment of sciatica and lumbago by means of electro-static modalities. He advises the Morton wave current. A piece of block tin 3 x 6 inches is applied over the painful area, using a spark-gap as

long as possible for a period of twenty minutes. The electrode is then removed and the grounding is reversed, the patient being connected to the negative side of the machine with the discharging rods widely separated. Sparks are then applied for a period of five minutes over the spinal region and legs. In the treatment of sciatica, sparks are applied over the region of the sciatic notch. Several successful cases are reported as having been cured by this method.

Dr. Barnum justly advises that we should always inform patients in regard to the painfulness of static sparks before applying them.

In the treatment of chronic arthritis, both the Morton wave current and sparks are utilized. The affected joints are first wound with narrow strips of malleable metal that are likewise bound securely in place by means of bandages. When both hands are affected they are prepared in the above manner, when one member is permitted to rest upon the other, there being a metallic contact between the two hands that are likewise connected to the positive side of the machine, the negative side being grounded, the patient, of course, sitting upon the insulated platform. The spark-gap is opened to tolerance. The duration of the séance is twenty minutes, after which, about a dozen short sparks are applied to each of the affected joints.

Dr. Barnum employs the Morton wave current with success in the treatment of local congestion and stasis.

Locomotor ataxia, he assures us, may be greatly relieved, if not cured, by this modality. The treatment consists in the application of the Morton wave current, sparks and friction sparks, the entire séance lasting an hour. The treatments are daily for several months, then two or three times a week for two years. In applying the Morton wave current, a long spinal electrode is employed, that is carefully applied over the entire region of the spine. Should there be marked tenderness in the lumbar region, this electrode is re-enforced by a strip of block tin of 3 x 6 inches, that is adapted to this region. The spinal electrode is attached to the positive side of the machine, the negative side being grounded. The spark-gap is as long as possible. The duration of the séance is half an hour, followed by sparks and friction sparks. The sparks are applied over the entire spinal region and soles of the feet. The friction sparks are made use of over the perineum and legs.

Dr. Barnum makes use of vacuum tube discharges, by attaching the vacuum tube to the positive side of the static machine, the negative side being grounded. He has successfully treated herpes zoster by means of this modality. Brachial neuritis and chronic arthritis affecting the smaller joints are also treated with success by this method. This treatment he also successfully employs in the treatment of acne and anal

fissure. In the treatment of the above conditions he also makes use of a resonator in connection with the static machine.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

"The Treatment of Mediastinal Carcinoma with the Roentgen Rays." By G. E. Pfahler, M. D., Medico-Chirurgical Journal.

Notwithstanding the apparently hopeless condition here involved the author reports six cases with remarkably good results. All six cases were secondary to operated breast cases.

Case No. 1.—White woman, age thirty-six years; breast removed in the fall of 1902; sixteen months after a recurrence took place in scar extending into axilla and mediastinum. A secondary operation was done, but could not remove all from the axilla without amputating the shoulder, and as the mediastinum was involved it was decided to leave it to the X-ray. Evidences of involvement of the mediastinum were a dry cough, a prominence of the region of the sternum and second interspace, over which the skin was red, with a space of dullness extending one and one-half inches to the right of the sternum. Roentgen ray examination showed a new growth in this area.

She was treated every day for five months with a high vacuum tube except on Sundays, at a distance of from fifteen to eighteen inches, each exposure lasting from twenty to thirty minutes with one milliamperere going through the tube. There was some tanning of the skin, but no bad result appeared and the physical signs showed the tumor much reduced in size and the general condition of the patient much improved. After the first five months the patient was treated three times a week tolerably regularly until June, 1905, when a dermatitis developed. This patient is doing her usual household work and is comfortable, but cannot be said to be entirely well. Without the X-ray she would not be living to-day.

Five other cases are reported which indicate hope for these otherwise hopeless cases. While the results are not perfect, they are very encouraging.

"Exophthalmic Goitre Treated by the Roentgen Ray." By Pfahler and Thrush, Therapeutic Gazette.

Female, age thirty-six years; negative history; noticed a swelling on side of neck May 30, and by the 3d of June it had reached its maximum size and remained stationary; while growing, it was accompanied by a dull pain. No cause for its occur-

rence was ascertained, but she had been very nervous for some months previously. Some twitchings of the muscles of the lower extremities were present with a sense in the throat of drowning or oppression. About one month before the goitre appeared she had a spell of some kind and when she recovered she was blind for an hour. She had distinct exophthalmos.

At the time X-ray treatment was begun the tumor, or left lobe of the thyroid gland, was five centimeters long and four centimeters broad. It was composed of ordinary gland tissue. The pulse was then 120 per minute.

She was treated three times a week, ten minutes at each exposure, with a tube of two and a half-inch spark-gap resistance, and with one milliamperere going through the tube. In one month there was considerable improvement both in the gland and the general condition of patient. This improvement continued until October, when the patient seemed to be well and treatment was discontinued. She was seen in November and her pulse was then 72, and she had gained twenty-five pounds. She had in all twenty-two treatments. There was at no time any redening of the skin. He thinks this was due to use of Pfahler's filter.

He gives a summary of thirty-one cases of goitre treated by means of the X-ray, four of which were exophthalmic and twenty-eight out of the thirty-one were much improved.

"X-Ray Burn of the Abdomen: Report of a Case." By A. D. Newborn, M. D., St. Louis Medical Review, April 14, 1906.

Patient, a German, age thirty-five; had a chill and pains in abdomen, followed by daily rise of temperature; after a week applied for relief to one of the New York City hospitals; was turned over to the radiographer of the hospital for a skiagraph of the abdomen. He was placed on a table and given four exposures of ten minutes each, or forty minutes in all. Four days later the burn of the abdomen began to develop as a raised, reddened area, accompanied by great pain.

Radiometric Methods. By Professor Dr. H. Bordier, Lyons, F. R. Archives of the Roentgen Ray, June, 1906.

The writer treats of the relative merits of the qualitative and quantitative methods of determining the output of a focus-tube.

The Qualitative Measures.

The Spintermeter of Beclere, which measures the length of the spark-gap, which is equivalent to the interior resistance of the focus-tube. By this means the degree of hardness of the tube and of the penetration of the rays is shown.

Benoit's Method, which needs a detailed description, a silver disc 0.11 millimeter in thickness is used as the standard of comparison. The penetration of the rays is measured by the thickness which gives the same intensity on the screen. The writer considers it a practical instrument for radiology.

The Milliampere-meter, by which is shown the quantity of the current passing into the X-ray tube, in which the quality of the ray must depend on the vacuum in the X-ray tube.

The Radiometer of Courtade, which shows various degrees of fluorescence on a screen of barium platino-cyanide compared with that produced by a specimen of radium. The instrument does not give the quantity of radiation and are comparative. The writer considers them unreliable on account of the variation of the quantity of fluorescence of the platino-cyanides.

"It is also impossible to be sure of getting a perfect equality of irradiation on the two screens, even supposing, what has not been proved, that the platino-cyanide is modified in a precisely similar manner by the X-rays and by the radiations of radium."

The Method of Contremoulins. This method is based on the same principle as the preceding. Instead of radium, the standard screen is illuminated by the acetylene light, and the method is open to serious objections.

The Quantitative Methods then considered by the writer are as follows: "*Holzkecht's chromoradiometer* employs a little capsule with a celluloid cover; is filled with a mixture of various salts, which shows changing colors under the action of the X-rays. The color changing in rays of greenish tint becomes gradually deeper as the quantity of the rays is increased. The scale, which is graduated, showing corresponding shades and tints, gives a relative key of intensity. The writer states that the fact that the colors of the reagent are not the same as that of the scale renders it exceedingly difficult to compare them accurately, so that with a practiced observer an error of 50 to 100 per cent. may occur.

In the writer's experience he has also failed to give the correct dosage.

Another disadvantage is that the tint of the small scale fades with time, even when the box is kept shut up from the light. In one year the scale became so faded as to show the same yellowish tint almost the whole of its length. The reagent chemically analyzed shows about 99.77 per cent. of potassium sulphate, the remainder being sulphite or hyposulphite, or possibly potassium tri-, tetra-, or penta-thionate in the mixed mass is impregnated and held together with copal varnish."

"It is evident that the choice of such a unit is open to many objections:

"(1) The rays required to produce a reaction of the first

degree are not the same for all patients and in the same patient they vary for different regions of the body."

"A unit of quantity for the X-rays should be defined by their action on a reagent other than the living tissue. We might, for example, take the coloration of some definite salt which is acted on by the X-rays, or the quantity of some chemical substance set free by the rays and absorbed by some chemical compound. In this way a unit would be obtained of well-defined value, easily reproducible, and always corresponding to the same quantity of X-rays."

It is shown, however, by concurrence with other authorities that the chromo-radiometer has many disadvantages, the principal of which is that it is difficult, if not impossible, to get the same dose exactly on two successive occasions. The writer believes "that under no circumstances should the same capsule be kept and used again," because the reintegration of the reagent is, however, only apparent and the quantity of rays required to obtain a given tint is always less with a capsule that has been previously used."

2. *"Freund's Method"* appears to be a means of measurement of very great promise. The reagent is a 2 per cent. solution of iodoform in chloroform. The iodoform, CHI_3 , is decomposed by the X-rays, setting free iodine, which gives a claret color to the solution. Unfortunately the reagent is equally sensitive to the action of light; hence the solution is not stable, and this fact has prevented the method from being brought into general use."

"Freund has proposed to estimate the amount of iodine set free by a method of titration. This would be a very scientific mode of making precise measurements, but the procedure is evidently not one adapted for clinical use."

3. *Sabouraud and Noire's Radiometer* is the method most generally used in France. The reagent, platino-cyanide of barium, is spread on a little disc of paper. This salt turns brown under the action of the X-rays." . . . "Sabouraud and Noire issue with their pastilles a standard color corresponding to the tint which the pastilles assume after being exposed to a given dose of X-rays."

The drawbacks of this method is that the pastille has to be placed at the distance of 8 centimeters from the anticathode, while the tissue to be irradiated is at another distance,—15 centimeters from the anticathode, to read correctly. When the pastille has taken the appropriate tint "B," as it is called, the skin has received its maximum dose, which cannot be exceeded without producing erythema, tumefaction, or permanent alopecia. This quantity of irradiation is sufficient to produce a temporary epilation only, and will not give rise to dermatitis.

"This method lays itself open to the following criticisms:

"(a) It is not always possible to place the pastille at the prescribed distance of 8 centimeters from the anticathode.

"(b) It is not easy to support the pastille at the fixed distance of 8 centimeters, while the tissue to be irradiated is maintained at 15 centimeters.

"(c) It does not enable us to measure the larger doses of X-rays which are sometimes required.

"(d) It is the custom, however, to reserve the pastiles for future use. This is a further source of error, as is shown by placing side by side a new pastille and one that was previously used. It will be found on irradiation that the old pastille will have taken a tint much deeper than the new one.

"(e) Still one other criticism of this method is that the tendency of the standard scale is to fade with the lapse of time, especially if frequently exposed to the action of light."

(4) *Kohler's Method*. This method attempts to measure the quantity of the X-ray by the variation of temperature in the focus-tube. This was indicated by means of a thermometer placed in a depression in the wall of the tube. This method is difficult to understand, as the degree of heat will depend upon the vacuum of the tube, and it has not been proved that the quantity of X-rays is in any way proportional to the temperature of the tube.

(5) *Kienbock's Quantimeter* is based on the actions of the rays on a specially prepared photographic paper.

The paper after exposure to the rays is developed and fixed with hyposulphite in the usual manner, and the paper is then compared with a scale of tints corresponding to the progressive doses of X-rays. The method is hardly a practicable one.

(6) *The Guilleminot-Courtade Method* depends on the principle of the radiometer of Courtade, which we have already referred to the radium. He takes for his standard a sample of radium whose radio-activity is 50,000. "He places his focus-tube at such a distance from the platino-cyanide screen as to procure an equal illumination on the part exposed to the focus-tube and that exposed to the radium. Under these circumstances the unit of quantity of X-rays is the quantity falling on one square centimeter of the surface during one minute. This unit he calls the unit 'M.' If, for example, the focus-tube has to be placed at a distance of 3 meters in order to procure an equal illumination of the screen, then the intensity of irradiation of the field at 3 meters from the tube is said to be unity. From this it is easy to calculate the number of units 'M' absorbed per minute at a distance of 10, 15 or 20 centimeters. Thus in the above example the number of units absorbed per minute at 10 centimeters is 900, while it is 400 at 15 centimeters

and 225 at 20 centimeters. As we know the ratio of the unit 'M' to Holz knecht's unit 'H,' we can readily estimate the time required to obtain any required number of Holz knecht units.

Compared to this method are the variations which the platino-cyanide undergoes and with the quantity of the rays absorbed by the tissues is not measured directly, but calculated.

(7) *Contremoulin's Radiophotometer* is a photographic totalizer, of no great practical use in radiotherapy. The author "makes use of two scales, each consisting of layers of electrically deposited silver of gradually increasing thickness—one of these increasing in arithmetical and the other in geometrical proportion. These scales are used as screens placed in front of a plate of the same sensitiveness as the radiographic plate. The two test plates are then developed under identical conditions, until the required depth of color appears. The impressions are then fixed both together under the same conditions. The time of exposure to the X-rays, together, the time of development, is noted for further reference. The author has also devised a very ingenious instrument, which he calls a metroradioscope, for measuring the mean penetration of the X-rays."

The writer concludes by saying that "he has shown that no method has been as yet devised which enables us to effect the dosage of the X-rays in a precise and practical manner." . . .

Then follows a description of a new method designed by him, in which he has undertaken to overcome many objectionable features of other methods which he describes as follows: "We will now proceed to describe the details in which the *Bordier chromoradiometer* differs from its predecessors. The barium platino-cyanide, suspended in a thin layer of collodion, is placed on the skin itself, or at all events in the same plane as the part to be irradiated. The pastilles are square, with a diameter of 6-5 millimeters. The back of the square is adhesive to facilitate attachment to the skin. A scale of colors is supplied with tints Nos. 1, 2, 3 and 4, corresponding to the principal reactions required in radiotherapeutic treatment.

"*Tint No. 1*, a pale yellowish-green, is the shade that the pastille takes when exposed to the maximum dose of rays compatible with the complete integrity of the normal skin. With this dose of X-rays the hair falls out some twenty days after the exposure, and grows again entirely in another twenty days. The skin shows no sign of inflammation or erythema, unless a very soft tube has been employed. We shall return to this question again later on. This is the 'weak normal exposure of Kienbock,' corresponding to a skin reaction of the first degree, accompanied by temporary loss of hair. This dose will produce diminution of a lupus nodule, or a more or less active inflammation of a patch of eczema, or psoriasis—i. e., an ex-

acerbation of congestive phenomena already pre-existing. This is the dose required in the treatment of alopecia, tinea, and for the treatment of internal tumors when it is desired to avoid all dermatitis, in which case each exposure should be separated from the succeeding one by an interval of at least a month. This is a rule to which there is no exception, for whenever the effect of succeeding exposures is cumulative, radio-dermatitis invariably follows:

"*Tint No. 2*, of a sulphur-yellow shade, is that which the pastille assumes when the skin has been exposed to an irradiation calculated to produce a strong reaction—viz., erythema, tumefaction, and, at the end of the reaction, marked desquamation. The latent period corresponding to this dose is from twelve to fifteen days. During this interval no abnormal symptoms appear, with the exception of a slight swelling of the irradiated tissue which comes on from twelve to twenty hours after the exposure. If, however, the tube is a very soft one a certain amount of redness may appear one or two days after the séance.

"This is the dose required in the treatment of acne, lichen planus, and certain forms of eczema and psoriasis. A similar dose may be employed in the treatment of internal tumors, fibroma, goitre, and carcinoma of the breast, if one does not object to the tumefaction and desquamation of the integument which will follow. In this case there should be an interval of at least six weeks between successive irradiations.

"The reaction corresponding to this No. 2 tint is a mild form of Kienbock's reaction of the second degree, the signs of the reaction remaining for two or three weeks after its commencement.

"The hairs are shed, but are not entirely reproduced, even after two or three months. This is the dose which, in our opinion, should be employed in the treatment of hypertrichosis.

"*Tint No. 3* is almost of the color of gamboge. It corresponds to a reaction of the skin of the second degree. This, on a normal skin, is accompanied by redness, vesication, and erosion with exudation. It is a true dermatitis. The latent period is eight to ten days, during which there are no signs of inflammation, provided that the skin is normal and the tube employed is not too soft. The lesion of the skin demands at least a month before it entirely disappears. This is Kienbock's 'strong normal reaction.'

"This degree of reaction corresponding to No. 3 tint should be reserved for cases in which one desires to determine an inflammation of the irradiated tissues—as, for instance, in the treatment of old patches of lupus, erectile tumors, or nevi.

"*Tint No. 4* is of the chestnut color, and corresponds to a reaction of the third degree, which is accompanied by necrosis and ulceration of the skin.

"This, which is the strongest dose ever required in radiotherapy, should never be applied to the normal skin, but may be useful as a single application in certain forms of epithelioma—warty or ulcerated epithelioma of the face or nose. Indeed, all forms of cutaneous cancer, which are usually included under the name of cancrroid or rodent ulcer, may be cured by a single application of the rays with a dose corresponding to this tint of the pastille, the reagent being placed exactly in the same plane and in close proximity to the lesion to be treated.

"In the construction of the instrument, the colors on the color-scale have been carefully prepared so as not to fade even when exposed to light. Each color is cemented to a separate slip of cardboard on which are printed the following particulars: (A) The degree of reaction corresponding to the dose; (B) the therapeutic effect; (C) the duration of the latent period.

"Each reference color is formed of a square of paper 15 millimeters wide, in the center of which is cut out a square aperture the size of the pastille. On applying a standard card to the pastille, it is easy to make the comparison. In this way it is possible in all radiotherapeutic applications to obtain a depth of color exactly equivalent to one of the standard tints." . . . The writer then details two experiments following which he states:

"These observations prove that the quantities of X-rays correspond substantially to the number of the standard tint.

"In radiopathic treatment we should use only the pure effect of the Roentgen rays, and avoid as much as possible the phototherapeutic action of a soft tube. Our instrument has been graduated for use with tubes of a moderate degree of hardness. . . .

"Finally, there is the question of the variation of the sensibility of the skin when exposed to the same dose of X-rays. We have already shown that there is a personal idiosyncrasy in this respect, and also a difference of sensibility in the same subject, according to the particular region irradiated. The difference of opinion on this subject is due to the absence hitherto of efficient means of measurement. We have noticed that the sensibility is increased in those parts of the body which have been subjected to friction; thus the neck of persons wearing tight collars is much more sensitive than the skin of the back. In a case of goitre, for example, an exposure corresponding to Tint No. 1 produced a radio-dermatitis, accompanied by vesication. . . .

"The following are the only precautions to be borne in mind:

"1. To avoid the incidence of a bright light on the pastille during the operation, which would retard the discoloration of the platino-cyanide.

"2. To use daylight only in comparing the pastille with the

standard scale. Gas, electric, or any other artificial light, modifies entirely the color of the salt.

"3. To use in each case a new pastille, and not to trust to one that has been already used."

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

Water Drinking Indications and Contra-indications.

It is well known that artificial, dry heat causes evaporation of moisture from the bindings of books and from joints of furniture, etc. That it should also cause increased surface evaporation in human beings is not surprising. Hence the necessity for drinking water at intervals during the day, especially for those in whom a certain amount of constipation with a tendency to hard stools shows that there is a diminished amount of water in the system, and that nature is only with difficulty able to carry on certain of her functions requiring water.

As the result of the successful employment of water to relieve many ordinary symptoms, it has become the custom to recommend water very generally and sometimes without sufficient deliberation. For the comparatively well, who need only to supply an equivalent for the moisture that is being lost—particularly through the skin and lungs—the simple advice to drink plentifully of water is almost sure to be good. In many diseases, moreover, the ingestion of water is an efficient aid to other treatment. For example, in bronchitis, especially if the accompanying cough be hard and ineffective, the taking of large amounts of fluid is usually productive of good results. In fact, it is on this therapeutic principle that the reputation acquired by many of the old home remedies depends. A warm drink taken just before going to bed will often keep a patient from becoming annoyed by a cough during the night.

On the other hand, to recommend abundant drinking of water may be, for patients suffering with some diseases, decidedly poor advice. For example, in the case of cardiac affections with failing compensation the necessity for an already weakened heart to overcome the resistance of a large amount

of fluid in the circulation is certain to invite further deterioration of the heart muscle. One of the well known and very serious forms of heart disease is the degenerate type which occurs in connection with the drinking of large quantities of such liquors as beer; the result is degeneration of the heart muscle and an extensive dilatation of the heart on account of overwork. It is easy to understand that a large amount of even so innocuous a fluid as water would tend to produce similar results. Whenever, then, there is loss of compensation in a heart that is laboring under some valvular defect, or under some degenerative process, the advice to drink plenty of water should be given with caution.

There is one class of cases, however, in which the unfortunately common custom of recommending the liberal drinking of water is likely to prove even more harmful than in heart disease. The first recommendation that too many physicians make to a patient suffering from almost any form of nephritis, unless there is marked ascites present, is to drink water abundantly. The idea is that in this way the system will be thoroughly "flushed out" and that the toxins in the circulation which may injure the kidneys will be diluted and made less harmful. The exclusive milk diet, so often suggested for nephritis, is really one expression of this old tradition. It must be remembered, however, that the value of this old-time advice lacks confirmation. Professor von Noorden, in his monograph on nephritis, has particularly insisted on the fact that this advice is often fruitful of more harm than good. In the American edition of his work on nephritis he says that water is always very badly excreted by the kidneys when they are actually diseased, and frequently also in sub-acute and in sub-chronic forms of nephritis, though individual cases differ greatly in this respect. He insists that the only possible way to determine whether water, which is in many cases one of the best diuretics we have, is indicated or not, is to determine whether the output of water bears a definite relation to the amount ingested. He adds: "A condition of hydremia must be regarded as a constant source of irritation of the kidneys, and the problem that confronts us is to prevent excessive stimulation of these organs as much as possible."

It is evident, therefore, that water drinking, usually a phy-

sologic, a hygienic and a remedial procedure of great value, in special cases may be attended with harm, and that the physician's advice to individuals should be given with reference to the particular case under consideration.

Hydrotherapy in Scarlet Fever.

R. W. Marsden (Pediatrics, November, 1904) believes nephritis in scarlet fever is not so wholly independent of the severity of the febrile attack as is usually supposed. His experience in hydrotherapy as a prophylactic includes a number of cases treated by the lukewarm bath, but without the use of the ice-pack or the regular administration of quinine. The baths were given every four hours for fifteen or twenty minutes, at a temperature of 90° F. Of fourteen patients thus treated, nine were under five years of age; one death occurred, a child of three. This cannot be claimed as a percentage mortality for the series, as only selected classes were employed. The most striking feature, showing the action of the baths, was the sedative influence, they often acting similarly to baths in typhoid fever, the patient falling asleep directly after removal from the bath. Marsden believes that short, cold baths give the greatest benefit in case there is no danger of producing cardiac failure. In doubtful cases, in young or weakly patients, the lukewarm bath is to be preferred, though the duration of it should also be short.

FOREIGN NEWS AND ABSTRACTS.

EDITED BY AMÉDÉE GRANGER, M. D.

Hydrotherapy in Tetanus.

Sadger (Zentralbl. für der gesammte Therapie) discusses hydrothrapy in relation to tetanus. The Priessnitz directions for the treatment of tetanus by means of massage, half baths of cool water, foot baths, and later by compresses over the affected parts, etc., are most complete, but are difficult to carry out without an almost unlimited staff of helpers. Currie and Wright, also Richter, recommend forms of treatment the common feature of which is letting cold water fall upon the patient from some distance. Much more common, however, than such methods has been the use of heat in the form of hot baths, steam baths, dry or wet packs, etc. Indeed, warm applications have been in use for centuries.

For example, Ambrose Paré is said to have cured a case of tetanus by enveloping the patient in warm dung. In the

American war of freedom a sailor suffering from acute traumatic tetanus was taken below during a fight and then forgotten, but when next seen was found to have recovered in the stifling heat. Some authorities recommend continuous steam baths, and French authors especially recommend warm baths. Recently Ribos Perdyo has used warm baths of from two to four hours' duration, frequently repeated, at the same time keeping off all causes of irritation, and he has obtained particularly good results.

Long-continued hot baths or steam baths have the great disadvantage of being almost impracticable in private houses, and difficult to carry out even in hospitals. In their use, also, there is not that alternation between heat and cold which not only has a favorable effect on the nervous system, but also increases perspiration and evaporation. On the other hand they give rise to a subjective improvement in the condition of the patient, and an intermission of the cramps, and they help to get rid of the poison in the system.

Some method which combines the advantages of the different treatments is needed, and in this connection the following case, reported by J. Anderson in 1875, is of much interest: The patient was a young and strong laborer, of rather more than twenty years of age. Anderson was asked to visit him in the country, and was told that the upper part of the patient's body was quite stiff, and that he could not turn his head or neck, and that he was supposed to be suffering with rheumatism. On inquiry it was discovered that the patient's teeth were clenched and his face distorted, and there was a history of injury to the thumb about a fortnight before. When Anderson and the doctor who had already been in attendance for a day visited the patient together they agreed that the case was one of tetanus, and told the friends of the patient that his death was to be expected in a few days. They decided not to confine themselves to drug treatment, but to try the effect of hydrotherapy. There was no bath in the cottage, but a large kneading trough formed a substitute. To get the patient into the bath was a matter of difficulty, for his body was stiffly arched. The patient was left in the warm bath until the muscular spasm was to some extent relaxed and he could lie stretched out and be put into a dry pack. The following four procedures were then carried out in turn: First, a dry pack until sweating set in; secondly, a cool bath with pouring of cold water over the patient, especially down the spine; thirdly, a wet pack; fourthly, a repetition of the cool bath. These four processes were constantly repeated for ninety-six hours. The results were excellent; the trismus had disappeared after twenty-four hours, and the tetanus after forty-eight hours, and only the fear of relapse led to a continuance of treatment for the second forty-

eight hours. That this fear was not groundless was shown by the fact that after Anderson's return home he was called up and told that the patient had again become stiff. This relapse was successfully treated by a repetition of the wet pack and the bath, and there was no second return of the cramp. The baths and packs were given for some hours on each of several days; the patient was soon able to leave his bed, and after fourteen days, when fully recovered, was able to visit Anderson in his own home. There is no definite statement as to the time which elapsed between the injury and the first symptoms of tetanus, but the symptoms appeared to have set in late, and in so far the prognosis was good even without treatment.

On consideration, however, of the case as a whole, of the stiffness of the whole body, the complete, or nearly complete, lockjaw and the relapse, Sadger judges the case to have been a severe one, such as ordinarily ends fatally with or without serum treatment. Of special interest is the rapidity with which the symptoms disappeared, and no other procedure is known to the author by which the tetanic cramp could have been overcome in forty-eight hours. The treatment has the great advantage of being not difficult to carry out, even in the most primitive cottage.

Hydrotherapy in the Treatment of Typhoid Fever.

In many old books on medicine we find accounts of a few cases of putrid fever treated or cured by applications of cold water. The putrid fever of that time is the typhoid fever of to-day.

During a trip from America to England Dr. Wright had the care of a sailor who suffered from a malignant fever from which he died. The lack of success from medication encouraged him to try upon himself a measure which he often desired to try in fevers of similar nature. He undressed and had an assistant dash over his body three buckets of sea water in succession. After his complete recovery, which was rapid, he applied the same measures to the other sufferers, with the result that a large number were cured in a few days.

Later many others used the same treatment with good success, but it is to Brand, of Stettin, that we must give the credit of having given to hydrotherapy the important place which it deserves in the treatment of typhoid fever.

Besides the therapeutic effects already mentioned, cold applications have the great advantage over other measures because they stimulate the vital functions of the organism and restore them their lost strength.

Statistics reveal the fact that cases of typhoid fever treated by means of the cold bath are less often fatal than those treated by the ordinary methods.

The indications for the bath are as follows:—

1. When the temperature is at 104° F. with a rapid pulse.
2. When the elevation of the temperature is accompanied by symptomatic manifestations, like delirium, muscular twitchings, cramps, contractions and ataxic disorders of all sorts.
3. When the pulse becomes rapid and the patient seems to be exhausted.

The temperature and duration of the bath must be modified to meet the indications, even omitted completely:

1. When weakness is extreme, the pulse showing a tendency to strong depression, the heart indicating a danger of failure, which would prevent its bearing without danger the inhibitory action of the cold water.
2. The presence of serious hemorrhage.
3. Intestinal perforation with its usual accompanying peritoneal complications.
4. Some consider respiratory complications as affording a contra-indication for the use of the cold bath, preferring to substitute for it cold affusions, the chest pack, or wet sheet pack.—(Translated from an article by Beni Barde in *Progres Medical*, by Modern Medicine.)

SOCIETY MEETINGS.

FIRST ITALIAN CONGRESS IN THERAPEUTICS OF PHYSICS, HELD IN ROME, MARCH 25-27, 1906.

The inauguration of the *First National Congress in Therapeutics of Physics* took place on March 25th at 10 A. M. in the large hall of Clinical Medicine at the Polyclinic.

The promoting committee of this congress was composed of Professors Camillo Boszols, Achille De Giovanni, Errico De Renvi, Carlo Forlanini, Pietro Grocco, Edoarolo Maragliano, Enrico Morselli, August Cambursin, Domenico Barduszi, Rosolino Colella, Giovanni Dotto, August de Luzenberger, Camillo Negro, and of Drs. Carlo Leveaschi, and Faust Feiffice.

Of the promoting committee there were present the Hon. President Professor Guido Baccelli, with Professors Boszols, Cambusino, Barduszi, Dotto, Levuxschi, Luzenberger, Negro, Treffice, as well as the secretary, Professor Carlo Colombo.

Among those present were also Comm. Rebucci for the prefect; the Assessor of Public Health Professor Gernari, the Hon. Casciani, Professor Gueild; Professor Ateoli, Professors Gaglio, Busineli, Ceccarelli, Cesari, Dinaj, Campana, De Amicis, Feri, etc.

The first to rise amid general attention was Professor Guido Baccelli, who gave the following address.

Illustrious Colleagues and Dear Friends: I hold it a great honor to be the first to greet you in this meeting of the leaders of the science and art of medicine, and I declare at once that I can tell you nothing you do not know already.

The invitation to constitute a National Association which should assert and propagate the incontestable utility which therapeutics of physics offers in the daily progress of our doctrines, was opportune and wise and you will discuss the way, certainly almost agreed in your minds, in which the Italian clinic may all take advantage of this renewed council in our wishes and judgments—I say renewed, because a hyatromechanic school had its cradle in Italy, and its creator was the illustrious Alfonso Borelli.

The XVIIth century was well advanced when, by the great example of noted men—and I will cite one for all, Galileo Galilei—an elite of doctors, under the leadership of the most illustrious men of the time, such as Bellini, Ramazzini, Malpighi, Bagliivi, Laueisi, etc., created a special line of teaching, which sought by the laws of mechanics, and with the aid of the mathematical calculus, to explain all the phenomena of living bodies. In this study was involved also the genesis of peculiar compensation, as much in the guarding and the development as in the reintegration of the forces of the organism.

The instruction in clinical medicine in Italy, wherever it is given, should be fully provided with two great means.

(1) With a thorough equipment for the diagnostic study of human diseases; and

(2) With a rich supply of curative means.

For both one and the other of these objects the application of physio-mechanical apparatus is a great auxiliary, and in the multiform variety of these each of us has certainly contributed the contingent of his own powers.

Let us unite, therefore, in brotherly fashion in this useful undertaking, as has already been begun analytically in many of our clinics, but certainly in its complexity in none.

And with the invitation, which I present, accepted by all, let us proceed to harmonious and fruitful work.

After the applause which greeted the address of Professor Guido Baccelli, Professor Gennari rose, the Assessor of Public Health representing the Syndic of Rome. He declared himself happy to bring, in the name of Rome, a greeting of good wishes to the congress presided over by his venerable and dear master Guido Baccelli.

Professor Colombo then arose. Secretary of the promoting committee Professor Colombo said that the success had been above their expectation, thanks to the illustrious clinical men, who had been willing to take part in the promoting committee. They had in a certain way, guaranteed the scientific character of the congress and the seriousness of its intentions.

He remarked on the number of members, which exceed 300, and enumerated the reasons of those absent. He read the assents of the Minister of the Royal Household, of the President of the Council of Ministers, a hearty telegram from the Minister of Public Instruction, and also from the many foreign associations of therapeutics of physics, among which were those of Antwerp, Paris, Berlin and Chicago, who in expressing their sympathy with the present meeting, hoped to become our guests in Rome on the occasion of the second National Congress of Therapeutics of Physics to be held in Rome in 1907.

The Italian Association of Therapeutics of Physics was then declared constituted.

At the afternoon session on the 25th, and at the morning session on the 26th, various scientific communications were read; among the most important of which were that of Dr. Guido Scarpa on The Necessity of Agreeing on a Uniform Conventional Terminology for the Description of Radioscopic and Radiotelegraphic Discoveries, that of Professor Codiville on Cervical Scoliosis, and lastly that of Professor Pescarolo and Dr. Gramegno on Radio-Therapeutics for Spinal Diseases.

Besides the above mentioned there followed also other communications from Dr. Scarpa, "Conditions which the Artificial Hydro-Carbonic Bath Should Fulfill in Order to be Rationally Efficacious and Innocuous"; "Conditions Under which One Could Speak with Rationality of Therapeutics by Means of Nebulizations and Inhalation, Considerations on the Necessity with a Certain Disease, That the Said Cure Should be Physically Complete, in Order that Inductions and Conclusions May be Drawn from Its Results," and lastly the communication from Dr. Nario Fontaina, "The Esocardium in the Therapeutics of Emphysema."

On March 27th, at 10 A. M., in the classroom of surgical pathology, there followed the discussion of important scientific arguments.

The general election of president and councilors was also held.

By general acclamation Professors Baccelli and Bojzolo were proclaimed honorary presidents. By vote there were elected as president, Professor Tantarini, of Rome; as vice-presidents, Professors Codiville, of Bologna, and Casciani, of Rome; as secretary, Professor Carlo Colombo; as treasurer, Dr. Cerutti; as councilors, Drs. Lurasch, of Milan; Colella, of Palermo; Luzenberger, of Naples; Dinaj, of Curin; Tessaro, of Padua; Roth, of Lassar; Capsiat, of Naples; Luisade, of Florence; Libertini, of Lecce; Dalleborn, of Genoa.

At the afternoon session various semi-official reports were read by Professor Negro, of Turin, and by Dr. Coleschi, of Rome, who systematized their observations in the following order of the day.

The assembly having heard the reports of the members, Professor Negro and Dr. Coleschi recorded its desire that the teaching of the therapeutics of physics in the universities of the kingdom should be raised to the rank of official instruction, and that it should be understood that the students of sanitation, who wish henceforth to use the therapeutics of physics, should attend the courses and pass the examinations.

Then followed the official report of Dr. Scarpa, of Curion, on the "Professional Relations Existing Between the Sanitary Therapeutics of Physics and the Other Independent Medical Men."

Scientific communications were then taken up again of which among others given at the morning session we report the respective titles: "Foreign Bodies in the Esophagus Extracted by the Aid of Radioscopies," by Drs. Fontaine and Tessaio; "Röntgen Therapeutics in the Institute of Therapeutics of Physics in Padua," by the same authors; "Influence of the Direction of the Current in Cerebral and Spinal Galvanizations," by Dr. Libertini; "Early Electrical Cure in Infantile Spinal Paralysis," by Dr. Luisard; "Some Cases of Practical Electro-Therapeutics," by Dr. Pujliesi; "Radio-Therapeutics of the Internal Organs," by Dr. Bertoloth; "The Mineral Waters of Casino Boario," by Professor Rivs and Dr. Feriato; "Some Modifications of the Antique Pneumatic Apparatus of Waldenburg," by Dr. Giglio; "Presentation of a Practical Vibrator of Recent Construction," by Dr. Basso; a case of lupus and a case of cancer, cured by radio-therapeutics, were reported by Dr. Ranolo; "Electro-Therapeutics of Neuralgia of the Trigemina," by Dr. Gavajzeni; "The Explorations of the Cephalo-Rachitic Liquid in the Course of Applications of Röntgen Rays," by Dr. Bertoloth; "Currents of High Frequency and of High Tension in the Therapeutics of Ozena of Blennorrhagic Rheumatism and of Neuralgia Rebellious to Other Remedies," by Dr. Lusesio; "Electric Tromogene for Oculio-Vibratory Massage and for Contemporaneous Electro-Therapeutics," by Dr. Carboni.

At both sessions on March 27th Professor Bardujei presided during the presentation of scientific communications.

Professor Colombo being indisposed his place, as secretary, was filled by Dr. Cesari.

At 6.30 P. M. President Bardujei declared the congress closed.

BOOK REVIEWS.

THE WORLD'S ANATOMISTS. By G. W. H. KEMPER, M. D. Published by P. Blakiston's Son & Co. Paper, price, 50c. net.

This little volume contains half-tones from photographs of numerous of the world's anatomists that have adorned the pro-

fession from the earliest times with brief sketches of the lives and work of the contributors to this valuable department of medical science. It is a convenient little hand-book for reference.

TRANSACTIONS OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION. Fourteenth Annual Meeting held at St. Louis, Mo., September, 1904. Illustrated, 280 pages. For sale by the Secretary, Dr. Albert C. Geyser, 1239 Madison Ave., New York. Price, cloth, \$2 net.

This volume of the transactions of the American Electro-Therapeutic Association is one of unusual interest, containing as it does a large number of papers dealing with the progress of medical electro-therapy. The papers included cover a wide range of physical therapeutics, including the uses of light, the X-ray and the various electrical modalities. The volume is one of exceptional value to all who would keep pace with the progress of physical therapeutics.

CLINICAL TREATISES ON THE PATHOLOGY AND THERAPY OF DISORDERS OF METABOLISM AND NUTRITION. By Professor Dr. CARL VON NOORDEN, Physician-in-Chief to the City Hospital, Frankfurt, a. M. Authorized American Translation Edited by Boardman Reed, M. D., Late Professor of Diseases of the Gastro-Intestinal Tract, Hygiene and Climatology, Department of Medicine, Temple College; and Physician to the Samaritan Hospital, Philadelphia; Physician to the American Oncologic Hospital, etc. Translated by Florence Buchanon, D. Sc.; and Walker Hall, M. D. Part VII. Diabetes Mellitus: its Pathological Chemistry and Treatment. Lectures delivered in the University and Bellevue Hospital Medical College, New York. Herter Lectureship Foundation. New York: E. B. Treat & Co., 1905. Price, cloth, \$1.50 net.

In this volume we have another of the valuable treatises by a writer who has distinguished himself as an original investigator of acknowledged ability.

He defines diabetes and divides the sugar manifestations into spontaneous and alimentary glycosuria. He covers in a most clear and practical manner the various phases of the subject with reference to the presence of sugar in the urine from physiological and pathological causes: treating the relation of the glandular and muscular systems to the production and storage of glycogen.

Of the causes of defective formation of glycogen he says that "we must approach the question as to what the deficient formation of glycogen depends upon" in relation to a defective metabolism, and adds that: "He who can answer this with certainty has solved the riddle of diabetes. To the pancreas we must first direct our attention."

He considers Lepine's theory and experiments and that of Cohnheim, both of whom recognized the relation of the pancreatic function to the derangement leading to diabetes.

He gives his own theory in which he attributes the cause to lesions in the pancreas, of which he says that: "The fact that diabetics can still form glycogen out of levulose, and that gly-

cogen is found to be deposited in the cells of the liver and muscles after feeding on levulose seems to point to the probability of its being rather a question of faulty formation of glycogen from grape sugar, than to its too rapid destruction." He considers the pathological conditions causative and resultant, and deals with treatment in detail from the dietetic point of view. He retails the author's oat cure, the rice cure, the milk cure, and the potato cure.

It is a valuable contribution to the literature of the subject.

SIXTH ANNUAL MEETING OF THE AMERICAN ROENTGEN RAY SOCIETY
HELD AT JOHN HOPKINS HOSPITAL, BALTIMORE, MARYLAND. Published
by the Publishing Committee of the Association, George G. Johnston, Sec.,
Bijou Bldg., Pittsburg, Pa.

This volume of the transactions is a valuable addition to the literature of the Roentgen ray. The papers presented at this section are of unusual merit and will be found of value to all students of the subject. The first pages of the volume are devoted to the X-ray in diagnosis, and include papers by Dr. Pfahler on Roentgen Diagnosis of Disease of the Lungs. The paper by Dr. Hulst on the Diagnosis of the Diseases of the Stomach and Intestines. The latter portion of the work is devoted to the use of the X-ray in Therapeutics. Several papers are published treating on the applications of the X-ray. Treatment of Keloids and Cancer; Treatment of Leukemia, Tuberculosis, and other subjects. The general character of the contributions as would be expected are such as should receive a careful perusal by the profession at large, as well as by those particularly interested in X-ray diagnosis and therapeutics.

NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

NEW X-RAY AND HIGH FREQUENCY APPARATUS.

A new line of high frequency and X-ray apparatus, invented and designed by Ralph C. Browne, of Salem, Mass., and built by the B. & B. Apparatus Co., of the same place, attracted considerable attention at the recent A. M. A. convention held in Boston.

The instrument here shown is a most complete apparatus, having many new and novel features that tend to greatly increase the efficiency of treatment.

Although the apparatus may be folded into a small compact case when not in use, in operation it presents a fine appearance

and, owing to its peculiar construction, there is claimed for it a very great range of power. The discharge is readily varied without the use of rheostats from a few hundreds of volts to hundreds of thousands at will, enabling light or heavy Crookes tubes to be used.

Prominent among the novel and unique features incorporated in the instrument and deserving mention, are the hand oscilla-



tor and pneumatic switch. The hand oscillator is a simple device that entirely frees the cords connecting the electrodes with the rest of the apparatus from the disagreeable sparking, etc., so often present. The pneumatic switch is arranged to enable the operator to have perfect control of the apparatus, even though both hands are engaged on the patient.

The instrument operates on either alternating or direct currents, is readily connected to the lighting circuit by means of a cord and plug, and owing to the readiness with which it may be taken from place to place, should open up a large field of work, it being very desirable in many cases to treat patients at their homes or at their bedside, rather than at the office.

As nothing has been sacrificed to make it portable, either in power, durability, or insulation, it is well suited for general office work.

THE SHELTON VIBRATOR.

The Shelton Vibrator is now recognized by medical authorities and leading instrument houses throughout the United

States and Europe as a standard instrument for physicians' use. It is light and portable,—only weighing three pounds,—and durable, being built by the largest electrical plant in the world. The vibrations are powerful from a heavy percussion stroke, to a wave, rotary or (Swedish massage) movement. Also a high frequency pulsation—ranging on a sliding scale from five to thirty thousand vibrations per minute—instantly regulated while in motion by the slightest touch of the operator and with absolutely no vibration in the handle.

It is designed solely for physicians' use, all points having been taken into consideration, with a view of placing, before the profession an instrument perfect in every detail.

The Shelton machine is made in four styles, No. 1 being designed for either the alternating or direct current, and is put up with four applicators in a velvet-lined carrying case.

The No. 2 outfit is the alternating current machine with resistance and it will operate on both the direct and alternating circuits, it being possible to control the speed of the motor.



This is also furnished with four applicators. It is a great advantage to have a machine that will operate on either current, as a physician might wish to take the machine to a patient where the current differs from that in his office, or he may move to a place where the same difference exists.

The No. 3 outfit is the same as the No. 2, except that it is furnished with nine applicators, and the No. 4 outfit is the same as No. 1, except that it has a full set of applicators. Cuts of the applicators and machines are shown herewith.

The machine is made by the Fort Wayne works of the General Electric Company for the Shelton Electric Co., Chicago, Ill., and the eastern agency is located at room 1018, 150 Nassau St.

THE DOUBLE VALVE TUBE RECTIFIER.

Two separate tubes joined together for convenience. The following description of one will answer for both.

This valve tube or rectifier is a modification of the original Villard tube of the French.

The vacuum is about one-half of that required for an X-ray tube; the essential difference being in the terminals, one terminal ending in a plain aluminum wire, requiring no disk or



other ending for its termination. This end of the tube must be attached to the positive end of the secondary coil; the other end of the valve tube ending in a heavy aluminum spiral. The larger the size of the wire and the greater the number of turns of this spiral, the more successful are the results. The spiral ending must be attached to the anode of the X-ray tube.

This tube is manufactured by the Wappler Electric Controller Co., 177 East 87th Street, New York.

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No. 8.

ON THE IMPORTANCE OF DIFFERENTIATION IN THE USE OF ELECTRIC MODALITIES.*

BY A. D. ROCKWELL, A. M., M. D., NEW YORK,

Neurologist and Electro-Therapist to the Flushing Hospital, etc.

The term electricity is, in a way, generic and includes a wide variety of manifestations. In atmospheric electricity we see in highest degree these varied manifestations, magnitude, voltage, with infinite rapidity of oscillation, and the combination is simply deadly in its effects. Man has in a measure triumphed over this lethal energy, has analyzed and dissected it, as it were, and made it subservient to his uses, both commercially and therapeutically. In therapeutics we utilize it in the form of the continuous current, one manifestation of which is represented by what is commonly termed the galvanic current with its magnitude and low voltage, the other by the faradic current representing a far higher voltage with negligible magnitude.

Static electricity represents a still higher voltage, with practically no magnitude, while high frequency currents are still other manifestations of electric force, with electro-magnetic induction effects, kindred to those from the primary circuit of an induction coil, but widely differing in the degree of their physical, physiological and therapeutic effects. The principles of the ordinary induction coil are here all carried out, the jars taking the place of the cells, with a spark gap instead of a rheotome or current breaker. Like the ordinary faradic current, high frequency currents require for their development some form of initial electric force transmitted through the medium of condensers, coils of wire of varying thickness and length, and like the ordinary faradic current, the relationships of magnitude and tension depend altogether upon the character of the initial force and the intermediate coils of induction. In the same way, therefore, as the faradic current can be made

*Read before the American Electro-Therapeutic Association, Sept. 19, 1905.

to differ widely in its effects—according to the character of its coils—so, too, with high frequency currents. It is the degree of the step-up process through which high frequency currents are obtained that determines their efficiency, and as there seems to be no uniform constructive standard among manufacturers, it is difficult, if not impossible, for different workers to compare results with absolute accuracy.

Now, if there is any one thing more than another that has retarded, still retards, and will continue to retard, the all-round and scientific development of electricity in medicine, it is the increasing tendency to neglect the subject of differentiation in the selection of the various electric modalities. Neglect is but another name for ignorance of the subject neglected, and ignorance leads not only to unsatisfactory therapeutic results, but in the case of so potent an agent as electricity, to damaging results that may be more than transient. I venture to say that the majority of physicians who are doing electro-therapeutic work to-day, whether as a side issue in general practice, or as in some sense specialists along this line, have failed to take a broad and comprehensive survey of the field upon which they have entered, and would be unable to define the principles which underlie the therapeutic uses of this agent.

The individual experiences suggesting these reflections have been many and frequent, one of the more recent of which I beg leave to offer as my text:

A physician who had made use of electricity consulted me some time ago as to its use in a case of pelvic pain. I suggested the high tension current by the bipolar method. He attempted the treatment, but succeeded only in inducing in his patient, a delicate, nervous young woman, a most violent tonic muscular contraction. The result was hysteria, increase of pain, and a general nervous breakdown, from which the victim has by no means yet recovered. In addition, the doctor was threatened with legal proceedings, which have been prevented only by much tact, aided by some substantial pecuniary consideration.

In this case, the trouble was caused through ignorance of the relation of quantity or volume, and tension, and the measure of their combined or respective influence on living tissue, together with unfamiliarity with the mechanism of the apparatus employed. It was desirable to produce a sedative effect through the use of the high-tension coil. To secure this effect and avoid

injury in the application of the varied manifestations of inductive energy, one must appreciate the fact that, through high resistances such as the skin, the high tension current exerts a vigorous action, while an induction current of low tension through the high resistance of the skin acts much less vigorously. On the other hand, when applied through the low resistance of a mucous membrane, the high-tension current acts with little vigor, so far as muscular contractions are concerned. Its effects are gentle, sedative and barely perceptible.

On the contrary, the induction current of low tension and increased magnitude acts as powerfully through the low resistance of the mucous membrane as do high tension currents through the high resistance of external surfaces; but producing effects that are irritating and decidedly painful.

A little personal experimentation will readily convince one of the striking difference in the action on nerve and muscle of these varying combinations of magnitude and tension. It is very easy accidentally to demonstrate this principle to the injury of the patient and the astonishment and chagrin of the physician. This is what may very readily occur, and what actually did occur in the case above recorded. A bipolar application with the current of tension is being made to some one of the mucous surfaces. The patient complains of an uncomfortable sensation which may or may not be due to the action of the current, and the slide is shifted so as to exchange the current of great tension, but negligible magnitude, for one of lesser tension, but appreciable magnitude, which, according to all the experiences of external application is infinitely weaker. Instantly a shock is occasioned, associated with the acutest pain and rigid contractions, that astonishes the operator and terrifies the patient. In all this, reference is made to that much neglected, but eminently useful modality commonly termed the faradic current, the physiologic and therapeutic action of which varies within its range of power in the same way as do high frequency currents. In the use of the latter, I have had frequent occasion to differentiate between its various manifestations, and have seen illustrated in a very positive manner their relative therapeutic, as well as physical, effects. It will be conceded that nutritional effects in greater or less degree attend the use of every electric modality; it is indeed this fundamental idea of its nutritional effects upon which in great measure

must be based its utility in medicine. That it works both ways—that alternating currents of high voltage may disturb as well as improve the processes of nutrition—has been recently observed among the employees in great power houses, where, exposed for long periods of time to such influences, grave functional disturbances of nutrition are not infrequent. My own use of high frequency currents has been mostly with static electricity as the initial force connected with the ordinary condensers, and for the primary and secondary coils, wires respectively 25 and 200 feet in length. It seems to me, after a considerable experience, that with this arrangement we get the two extremes of high frequency effects that will accomplish about all that can be expected from more elaborate combinations. The current from the secondary coil with its tension and enormous frequency, but without magnitude, yields, as one would naturally infer, results that are quite superficial: valuable for its effects upon the periphery, but much less efficient, so far as constitutional or deep-seated nutritional effects are concerned.

The current from the primary coil with lower tension and frequency, but with far greater magnitude, not only influences the periphery and superficial skin lesions, but exercises a distinctly deep-seated nutritional effect. An interesting confirmation of this fact was recently observed in a case of pseudo-hypertrophic muscular paralysis. Now, muscular paralysis of this type is admittedly an incurable disease. During the course of my experience a number of such cases have been subjected to a thorough course of electrical treatment, including continuous and static methods, but never with the slightest benefit. The developmental tendency to tissue growth, which is its essential element, has thus far baffled every effort. While, like locomotor ataxia, this disease is progressive, there is often seen, as in the latter condition, periods of retardation and apparent arrest, so that certain drugs, such as arsenic and phosphorus, have been supposed to exert a distinct influence in temporarily, at least, arresting the progress of tissue growth, but thus far there has been no satisfactory proof that this arrest is anything more than a part of the natural course of the disease. What has interested me in two cases that have come under my observation was not simply an apparent arrest, but a very positive improvement under the influence of high frequency currents of magnitude, administered, not by the indirect method of

D'Arsonval or the method of autoconduction, as it has been termed, but by the administration of the spark itself by the direct bipolar method. This improvement manifested itself in three pronounced ways: First, by the ability of the patient to get in and out of a street car without assistance—something that she had been unable to do before in the progress of the disease—for the past six months; second, in the ability to walk unaided without frequently falling; third, in such an increase of power over the waist muscles as to enable her when bending far over to raise her body to the erect position without the aid of her hands.

Further progress has not been, and in all probability will not be attained, and the progress of the disease will not be permanently checked, but the case illustrates in a very interesting way the superiority of a magnitude over pure tension and frequency in influencing the nutritive processes, and is but another illustration of the importance of differentiation.

The rationale of the superiority of currents of magnitude in not only ameliorating the symptoms of many organic conditions, but aiding in the cure of deep-seated congestive conditions, may be explained by its superior vaso-motor influence, with relief of blood pressure, improvement in nutrition of degenerated nerve cells and consequent development of potential energy.

The superiority of the continuous current of magnitude (galvanic current) over all other manifestations of electricity for the relief of inflammatory exudates, is, or ought to be, too well known to need any emphasis of mine. And yet it is not uncommon to find physicians using other forms of electricity, and especially high frequency currents, in the belief that they were utilizing the best methods; forgetting that the rationale of the action of electricity upon all inflammatory exudates is based upon chemico-physical action, and that in the continuous current of magnitude alone do we get appropriate and satisfactory electrolytic and absorptive effects. In discussing the admittedly difficult subject of differentiation, there is one combination of electric forces that deserves consideration. I refer to combined electrization or the transmission to the body through the same electrodes of the direct and to and from currents (the galvanic and faradic). To determine its distinctive value is certainly more difficult than to differentiate between the individual modalities of electricity. It is very much a question of practical

experience aided in some degree by our knowledge of the physical and physiological action of the various modalities. Each of them possesses a certain limited power to relieve pain, one succeeding where another fails, and the reason for success or failure, can often be accounted for through misapplication—the application of stimulating effects where sedative effects are called for, and vice versa. Combined electrization is not efficient for the relief of pain in any such degree as the various single manifestations of electricity. On the contrary, it is more likely to increase than to decrease any form of pain, simply because its combined mechanical and chemical or electrolytic action is bound to act counter to the effect desired, whether it be sedative or stimulating. On the other hand, its musculo-sedative effects are pronounced, rendering it distinctly more valuable in the relief of spasmodic conditions than any single modality.

The superior effects of galvano-faradization in the treatment of constipation and entero-colitis which I have often observed, and which have been emphasized by some others, notably by Bordier and Delherm, I am inclined to attribute to this control of muscular spasm which is believed to be a not infrequent accompaniment of intestinal atony.

616 Madison Ave.

Discussion.

Dr. Massey: We can all learn something from Dr. Rockwell, who is getting younger in appearance every year. We all know him as the representative American pioneer.

While the doctor was reading his paper and telling us how that young lady was thrown into attacks of hysteria by a sudden shock occasioned by the improper employment of a high tension current I was reminded of a similar occurrence that happened in New York, when an operator lost control of an apparatus and severely shocked his patient, whereas if he had had control and had turned off the current properly he could not possibly have shocked the patient. Occasionally there may be mishaps, but if the man makes sure of his current, continuous induction and combination current, and the controller is turned off before making a change, there will be no shock to the patient. Some operators lack certain primary knowledge, without which

knowledge no man has a right to touch a patient with an electrode.

Dr. Files: The use of electricity in a mild form and applied by a physician in general practice only, will do the patient very little harm, and it makes no difference or very little difference whether he uses one form or another. It is like giving a boy a dull knife to play with; substitute a razor and he is likely to get cut. The trouble we have generally is the lack of knowledge of the leading principles that go to make up the science of electro-therapeutics. That is one of the things in which we should take a lesson from Dr. Rockwell's paper, making up our minds to know more perfectly the leading principles of the science so that we may be sure to do no harm and know better whether we are doing good or not.

Dr. Francis Bishop: I am under the impression if any one has a right to speak with authority upon the use of the continuous and alternating currents, it is Dr. Rockwell. I may have misunderstood him, but if I have heard him correctly, he has drawn a comparison between high frequency currents as given through the aid of Leyden jars, and the induced current. There is a great difference between induced and high frequency currents. In the induced current, high tension would have a uniform effect, while in the high frequency current it would not. That can be demonstrated by the X-ray. So far as his remarks refer to therapy I thoroughly agree with him.

Dr. Rockwell: In closing the discussion will say with regard to the statement made by Dr. Massey about the proper use of controllers, that in any kind of machine, when the man in charge has not the necessary knowledge of how to work it, there will be bad results.



STATIC MODALITIES AND THEIR THERAPEUTIC APPLICATIONS.

BY ARNOLD SNOW, M. D., NEW YORK.

In this age of progress, when it is the duty of every physician to employ every legitimate means known to science for the alleviation of human suffering or be open to censure for such neglect, physical measures are receiving more consideration and their merit and range are being more widely tested. Their use should never be empirical, as is too often the case. Their employment should be rational, the selection being made with due regard to what may be accomplished by each measure respectively, taking into consideration the pathological condition present, and how it may be overcome by the measure or modality best adapted to obtain the desired result. Such selection can only be made wisely when the practitioner is familiar with the therapeutic action of the physical agents. Their physiological action and therapeutic application demand study and thought, and probably no physical agent requires as much careful consideration as the static machine with its varied modalities and their wide range of therapeutic application.

The static modalities are classified according to Snow as disruptive, connective, and conductive, besides auto-condensation, auto-conduction, and the X-ray.

The disruptive discharges include the direct spark, the indirect spark, the friction spark, and the Leyden-jar spark. The indirect and friction spark are the most important.

The direct spark as shown in Fig. 1 is connected and administered as follows:

(1) The balls of the discharging rods should be widely separated and the machine operated usually at a rate of speed relative to the length of spark desired.

(2) The patient on the insulated platform may hold the shepherd's crook in his hand, the crook being connected with the positive pole of the machine. Instead of holding the crook it may rest on a metal plate on which the patient's feet are placed, his shoes having been removed.

(3) The operator then administers the spark with the large

metal-ball electrode, which is connected to the negative pole of the machine by a wire or short chain, which is held away from the operator and the patient by means of the spiral holder held in the operator's left hand.

(4) Start the machine, the patient being seated or standing as the operator can most easily apply the sparks accord-

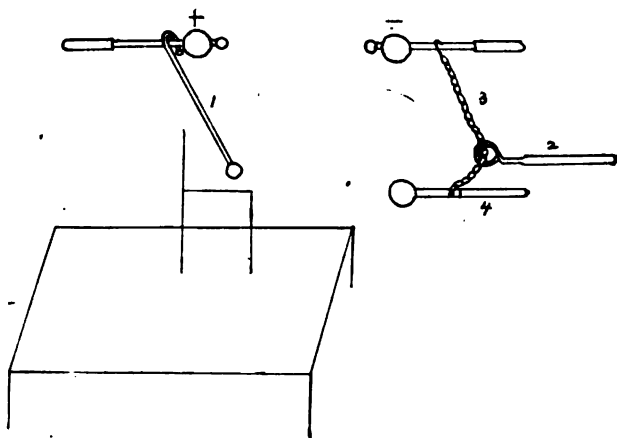


FIG. 1. 1, Shepherd's crook held by patient. 2, Spiral holder. 3, Chain from negative side to ball electrode. 4, Ball electrode.

ing to the part under treatment, that is, for instance, an arm or hip.

The direct spark is very painful, sharp, thin, and burning in character, and is used only in humid weather when the output of the machine is not sufficiently great to give sparks of sufficient length as indicated in the treatment of the condition in question. Its indication and use are the same as that of the indirect spark.

A modification of the direct spark is illustrated in Fig. 2.

The shepherd's crook is placed on the platform under or beyond the patient's chair instead of the patient holding it or standing on the metal plate with which it is connected.

The administration of the indirect spark may be given with or without a discharging spark-gap as in Figs. 3 and 4. If the discharging rods are widely apart the speed of the machine must be comparatively slow, as the length of the spark given will vary the speed of the machine, the position of the shepherd's crook being the same. The length of the spark may

be slightly modified by the operator drawing off the current by placing one foot on the platform, at the same time taking care that it is not near enough to the crook or the patient's feet for a spark to pass from them. The discharging rods may

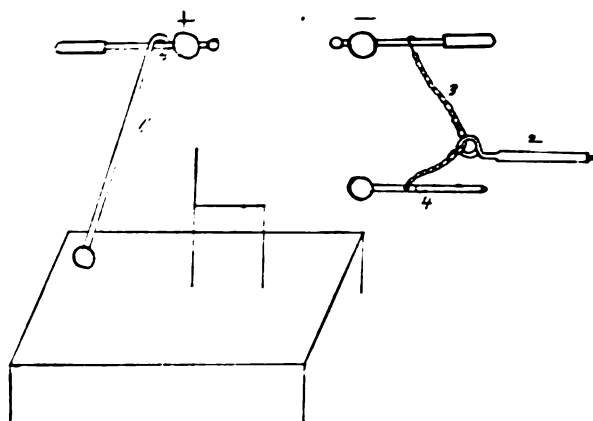


FIG. 2. 1. Shepherd's crook. 2. Spiral holder. 3. Chain from negative side to ball. 4. Ball electrode.

be but slightly separated, with a spark whose length will regulate approximately the length of the spark administered to the patient, other factors being the same. By this method the speed of the machine need not be varied during a treatment of the entire body, as is often necessary in a severe case of rheumatoid arthritis where the small and large joints of the body are more or less involved, requiring a variation in spark length.

The methods of administering the indirect spark shown in Figs. 3 and 4 are as follows:

(1) With or without a discharging spark-gap, the shepherd's crook or rod should connect the positive pole of the machine with the insulated platform. If the operator wishes to increase the length of the spark by regulating the speed, the crook may rest on a metal plate about 12 by 12 inches which acts as a condenser on the platform.

The nearness of this plate or the crook to the patient's feet, or the rate of speed, will govern the length of spark.

(2) A ground chain should connect the negative pole of the machine to damp earth by a metallic conductor as the gas or water pipe.

(3) A ground chain to a gas or water pipe should also connect the metal-ball electrode with the earth. The operator should then hold the ground chain by the side of the electrode

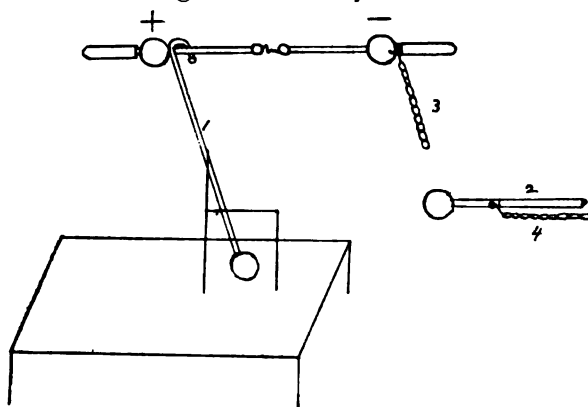


FIG. 3. 1, Shepherd's crook. 2, Ball electrode held by operator. 3, Ground chain to water pipe. 4, Ground chain to gas pipe.

in the right hand in order to keep the chain from swinging against the patient. In the absence of either a gas pipe or water pipe the groundings may be iron rods driven into damp earth.

Sparks should be administered by a wrist movement. Their length should be governed by the part treated,—a spark half an inch long is applicable to the finger joints, while one three inches long is required for the shoulder. The spark should be fat. Bony prominences, the breasts, nails, and genitalia should be avoided in the administration of sparks. Sparks may be given singly or in rows, which are usually better tolerated over groups of muscles. Single sparks should always be given successively in the treatment of a joint. In giving rows of sparks hold the ball electrode in such a manner that the ball will parallel the part treated as a forearm. Movements should be made as quickly as possible in order to prevent a succession of sparks to one spot, which is decidedly unpleasant for the patient.

Snow's *spark director* (Fig. 4) is an aid in localizing the sparks. It saves both mortification to the operator and discomfort to the patient, directing the discharges to clefts and cavities.

If the clothing is damp or of a poor quality of material

the patient may hold a woolen cloth or a paper over the part to be sparked, or the spark director may be employed, for otherwise sparks will not pass to the patient.

The therapeutic indication for sparks is unlimited, as they so promptly relieve congestion by getting rid of stasis. They induce contractions which squeeze the fluids out of a part and

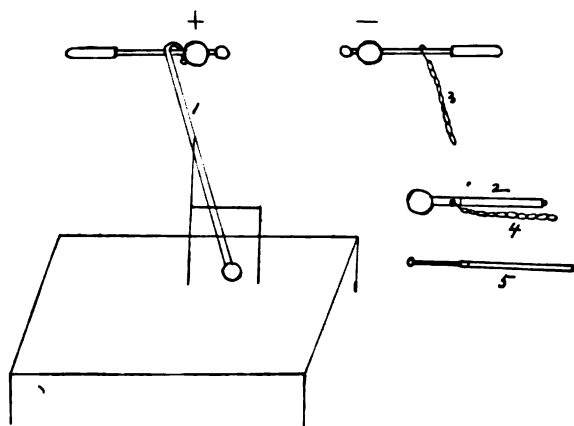


FIG. 4. 1, Shepherd's crook. 2, Ball electrode. 3, Ground chain to water pipe. 4, Ground chain to gas pipe. 5, Spark director held in operator's left hand.

thus relieve the conditions resulting from a congestive process. They promote absorption and hasten regeneration. They are particularly indicated in the treatment of sciatica, lumbago, rheumatoid arthritis, sprains, synovitis, and edema following fracture. They maintain the tone of an inactive part, relieve rheumatism, gouty diathesis, and pain due to congestion. They are valuable in the treatment of nervous disorders, as locomotor ataxia and hysteria. They are sometimes used alone and sometimes in conjunction with the wave-current when a tonic action is required.

To apply the *friction spark* the connections are the same as in giving the indirect spark, the operator rubbing the part to be treated with the ball electrode, passing it rapidly over the clothing, it being connected with a ground chain.

This spark produces a superficial effect, giving warmth and a glowing sensation. It relieves pain if not deeply seated and stimulates particularly peripheral circulation. It is indicated

in the treatment of anesthetic areas in locomotor ataxia, hysteria, and superficial myalgias.

The connections for the *Leyden-jar sparks* are as illustrated

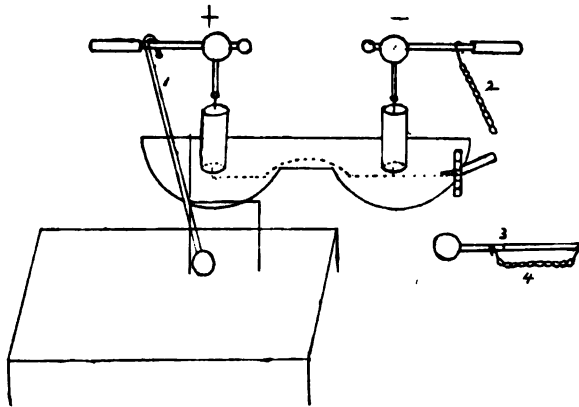


FIG. 5. 1, Shepherd's crook. 2, Ground chain to water pipe. 3, Ball electrode. 4, Ground chain to gas pipe.

in Fig. 5. They are the same as for the indirect spark, with the addition of two Leyden jars which may be of three sizes.

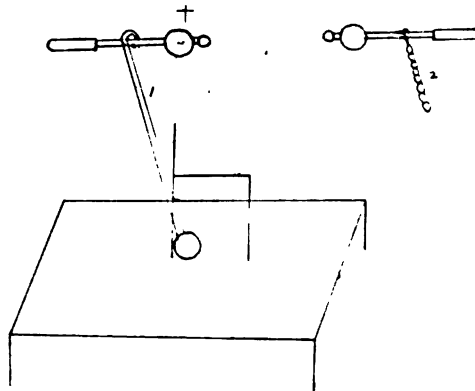


FIG. 6. 1, Shepherd's crook. 2, Ground chain to water pipe.

The spark is too severe for use unless in the treatment of lethargic states.

The convective discharges include static electrification, interrupted electrification, the breeze, the spray, the brush discharge, and high potential and high frequency discharges from the vacuum tubes.

Static electrification is illustrated in Fig. 6, and is given as follows:

(1) The patient seated in the chair, the balls are widely separated.

(2) The shepherd's crook extends from the positive or negative pole to the insulated platform, and the other pole is grounded. This modality is administered as a mild sedative.

Interrupted electrification is illustrated in Fig. 7. The dif-

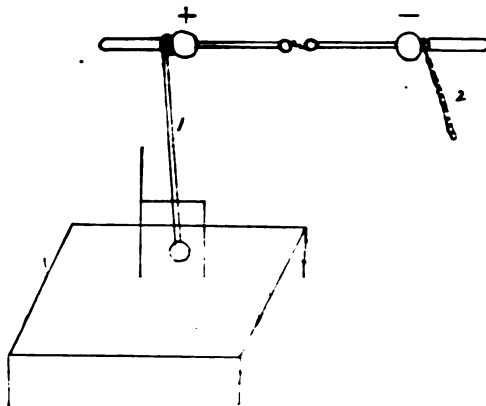


FIG. 7. 1, Shepherd's crook. 2, Ground chain to water pipe.

ference between it and static electrification is the discharging spark-gap. It has a more pronounced effect than static electrification uninterrupted. The noise of the discharging spark-gap, however, is disagreeable to some patients. Static electrification may be interrupted by the operator moving the ball electrode, grounded, past the positive pole.

The static breeze, illustrated in Fig. 8, is administered as follows:

(1) The patient seated, the poles of the machine are widely separated.

(2) The shepherd's crook extends from the positive pole usually either directly to the hands of the patient or to the insulated platform and the other pole is grounded.

(3) The stand is placed with the point electrode near some part of the patient or with the crown electrode over the head as indicated or preferred.

If one of the ground chains is connected to the stand the discharge is intensified. Either the point or crown should be

removed just enough so that the patient will not experience a feeling of warmth and prickling.

This modality is used in the treatment of anemic or some types of nervous headache.

The static spray is illustrated in Fig. 9, and is administered as follows:

- (1) The poles of the machine are widely separated.
- (2) The patient, insulated, holds the shepherd's crook, con-

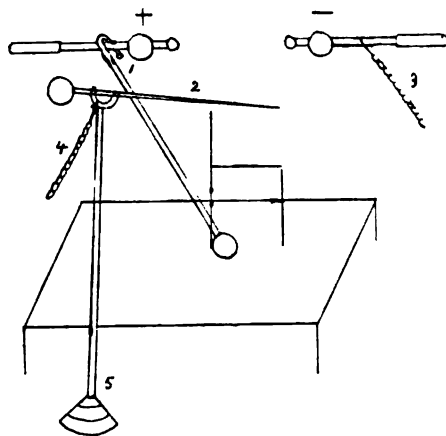


FIG. 8. 1, Shepherd's crook. 2, Point above patient's head. 3, Ground chain to water pipe. 4, Ground chain to gas pipe. 5, Stand for holding point or crown electrode.

necting him to either side of the machine, preferably the positive side.

- (3) The negative side is grounded.
- (4) The operator then administers the breeze by a to-and-fro motion usually of the wire brush or pointed electrode, which is also grounded.

The static spray is a mild peripheral stimulant. It is indicated in some nervous conditions where a general superficial glow or warmth is desired, or when it is desirable to induce an active hyperemia superficially. The operator must take care lest he hold the electrode too close to the patient, when a spark will be discharged often to the annoyance of the patient.

The brush discharge is illustrated in Fig. 10, and the connections are as follows:

- (1) The poles of the machine are widely separated.
- (2) The positive pole of the machine is connected with the ground.
- (3) The shepherd's crook always connects the negative pole of the machine with the patient insulated. If a mild current is desired, as in administering the brush discharge to the ear, the crook is held by the patient and the machine run slowly, or it may rest upon the platform. Otherwise the rod may be held by the patient and the machine run rapidly.
- (4) The discharge is administered with a long wooden electrode in the end of which may be inserted various terminals.

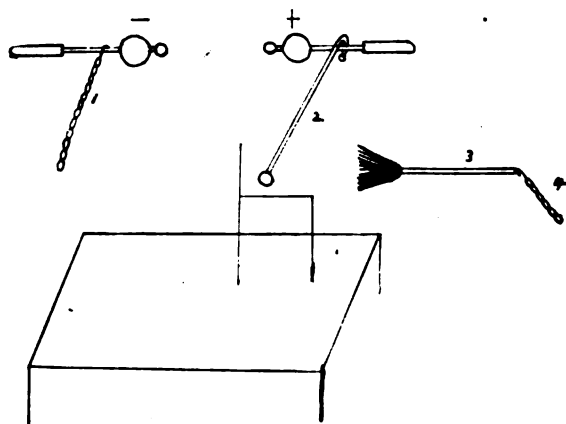


FIG. 9. 1, Ground chain to water pipe. 2, Shepherd's crook held by patient. 3, Wire brush electrode. 4, Ground chain to gas pipe.

A metal cylinder about three inches in length is slipped over one end of the electrode and the ground chain is hooked to an eye or held in contact with the cylinder. Care should be taken that the fingers do not extend beyond the cylinder, or an accidental spark may pass to the operator's hands. The hood or cylinder acts as a rheostat or controller as it is moved to or from the terminal end of the brush-discharge stick; the resistance being thus varied. If the wooden electrode is used by the operator without a ground chain, the brush discharge is milder in character.

Various terminals are used, as a wooden ball, a wooden point, a metal ball, a metal brush, a metal point, a small metal ball on a rod of vulcanite about four inches long, a large

metal ball on a vulcanite rod about three inches long. The last four terminals localize the discharge. A glass hood is sometimes slipped over the vulcanite terminal. This sleeve may be straight or slightly curved at the end. It is very serviceable when the operator desires to make application to cavities or depressions.

If the brush-discharge stick electrode be heated or dampened the output is increased because the resistance is less. To dampen the stick is preferable, taking care that it is not made too wet lest sparks pass to the patient. The brush-discharge

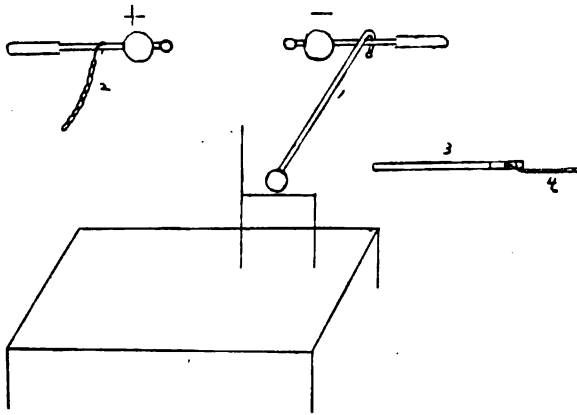


FIG. 10. 1. Shepherd's crook held by patient. 2. Ground chain to water pipe. 3. Wooden electrode with metal sleeve. 4. Ground chain to gas pipe.

stick is best when made of the white part of maple, white wood or holly.

The English use a metal effleuve, or a Bissière brush,—a metal electrode in a sliding glass tube, or with an adjustable spark-gap on the handle.

The brush discharge is indicated where superficial congestion is present. It is also a peripheral stimulant and a counter-irritant, antiseptic, and rubefacient. It is especially indicated in the treatment of facial neuralgia, eczema, lupus, ulcerations, acne, herpes, hyperesthesia, ecchymoses, superficial swellings, boils, felons, tonsillitis, swelling following fractures, sprains, and similar conditions.

The high potential currents with vacuum tubes may be obtained directly from a static machine or through a static transformer, of which various types are manufactured. This current may also be obtained from the coil, but from that source it lacks the contractile property which characterizes the static discharges. The current directly from the static

machine is best administered with the patient on the insulated platform.

The illustrations, Figs. 11 and 12, represent this current taken directly from the static machine.

(1) The opposite poles are but slightly separated, so that there is a discharging spark-gap.

(2) The vacuum tube may have a leading-in wire or not. If it has a leading-in wire the rheophore connects it directly with the positive or negative side of the static machine. If there is no leading-in wire connect the tube to an insulated handle and by a rheophore to either the positive or nega-

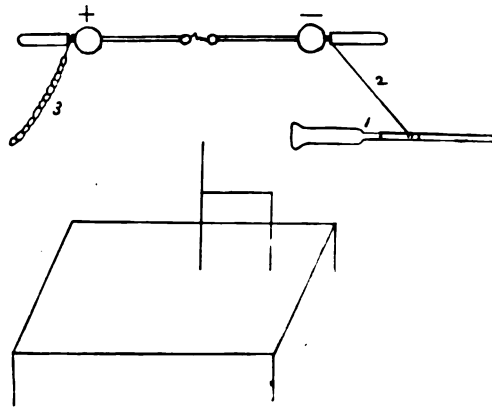


FIG. 11. 1, Vacuum tube held by operator or patient. 2, Connecting wire. 3, Ground chain to water pipe.

tive pole of the machine, as indicated. If the condition to be treated is a simple inflammation connect to the positive side, but if an infective process the current from the negative pole producing the greater chemical and actinic action is required. The handle may be held by the patient or operator, or when applied to the vagina or rectum may be held in position by the X-ray tube holder.

(3) A ground chain should always connect the other pole of the machine with the damp earth.

The vacuum tubes are of many forms and shapes including the surface, vaginal, urethral, hemorrhoidal, nasal, rectal, anal, post-nasal electrodes, and a special electrode for the treatment of pyorrhœa alveolaris.

The action of the high potential currents applied in this manner is stimulating. It lessens hyperemia, relieves pain, contracts and vibrates tissue, is antiseptic and rubefacient, and is also employed in the treatment of fissures, ulcers, hemorrhoids, uterine congestion, lupus, and acne.

The illustration (Fig. 13) shows the method of making the connections for administering the high-potential current with the vacuum tube or other electrode in connection with a resonator.

- (1) The opposite poles of the machine should be widely separated.
- (2) Connect rheophores from the machine to the Leyden jars of the resonator.
- (3) Ground one side of the coil of the resonator.
- (4) Attach a solenoid to the other side of the resonator coil by a wire connection.
- (5) Then attach a wire from the vacuum-tube handle or other electrode to a ring in the extreme end of the solenoid,

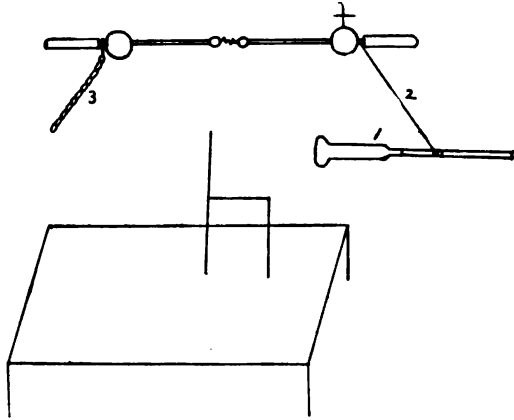


FIG. 12. 1, Vacuum tube held by operator or patient. 2, Connecting wire. 3, Ground chain to water pipe.

which is employed to increase the potential or spark length of the discharge. Regulate the discharging spark between the poles of the resonator to the spark length desired.

The resulting discharge is rather stinging and hot in character, but can be more readily borne by patients than indirect sparks. It is useful particularly in skin affections.

The *conductive discharges* include the static induced, first discovered by Morton, the Morton wave-current, and the vacuum-tube current when applied in contact with the surface.

The *static-induced current* is connected as shown in Fig. 14. The connections are as follows:

- (1) The poles of the machine are but slightly separated.
- (2) Two Leyden jars—small, medium, or large, or one of each of two sizes—are connected to the respective poles of the machine. By employing Leyden jars of different sizes it is possible to give more current to one part than another.

(3) Rheophores, or wires, attached to binding posts connect the electrodes, which may be of sponge, metal, or glass vacuum tubes, or one may be of metal and one a vacuum electrode, with the machine.

The current is opened or closed according to the manipulation of the regulator. It may be made a make-and-break cur-

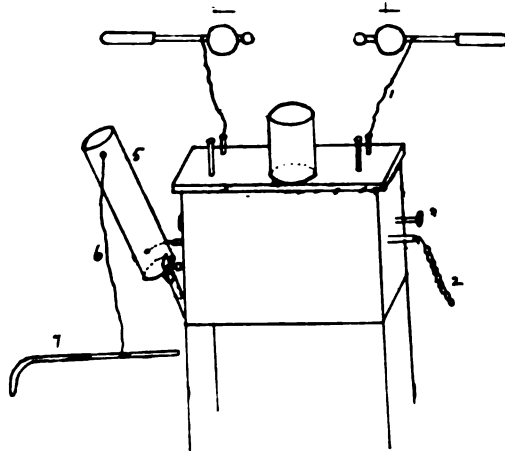


FIG. 13. 1, Wires connecting the pole to the Leyden jars. 2, Ground chain to water pipe. 3, Spark-gap regulator for Leyden jars. 4, Wire connecting solenoid with coil. 5, Solenoid. 6, Wire from solenoid to handle for vacuum tube or to a ball electrode or carbon point. 7, Vacuum electrode.

rent by manipulation of the regulator,—it being closed when the metal bar is in contact with the metal beneath the opposite Leyden jars.

Cleaves' water rheostat or Morton's high-frequency apparatus or other transformers may be used to modify the current if desired.

The static-induced current is usually a disagreeable current on account of its intensity, but is especially useful in some painful neurotic conditions and when the weather is humid and but a very short discharging spark can be obtained, in which case it is applicable for local effects to cases treated ordinarily by the wave-current, but produces none of the tonic effects of that modality.

The wave-current is illustrated in Fig. 15. The connections are made as follows:

(1) The poles being close together should be gradually separated according to the patient's tolerance under existing conditions, after the machine is started.

(2) The negative side is grounded to a metallic connection to the earth.

(3) A metal electrode on the surface or in a cavity of a patient is connected by a wire to the opposite pole. These electrodes are made of a malleable composition metal except those for treating the cavities. They are made of different shapes, as for the spine, abdomen, shoulder, knee, etc. The

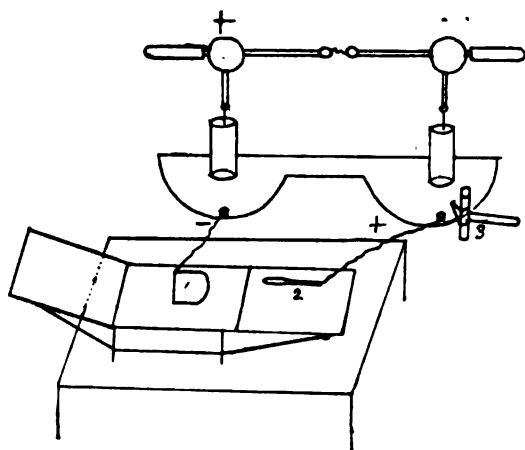


FIG. 14. 1, Abdominal electrode. 2, Rectal electrode. A vacuum tube may be used instead. 3, Regulator connected with rod beneath apron the manipulation of which will make or break the current.

length of the spark-gap should be governed by the patient's tolerance.

This current is of marked value, and its application therapeutically is far-reaching.

It gives a marked vibratory treatment, producing intrinsic tissue activity and contraction. It lessens hyperemia, increases secretion and excretion, and has a general tonic effect.

It is applicable to numerous nervous conditions, all non-infectious inflammatory states, including sprains, rheumatoid arthritis, brachial neuritis, sciatica, lumbago, synovitis, and is successfully applied per rectum, for the relief of prostatitis, uterine congestion, dysmenorrhea, and amenorrhea, and is employed for its tonic effect in all adynamic conditions and convalescence.

The *auto-conduction* method is shown in Fig. 16, and is administered as follows, according to Snow :

(1) The poles of the machine are placed so that a spark discharges at the spark-gap.

(2) The patient lies on an auto-condensation couch or chair insulated by felt or other non-conducting material, beneath which is a metal plate 5 feet by 16 to 20 inches in width, and suspended above the patient is a half-section of a wire cage.

(3) The metal plate beneath the cushion is attached to the positive pole of the machine by a wire.

(4) The half-cage is connected by a ground chain to the gas pipe.

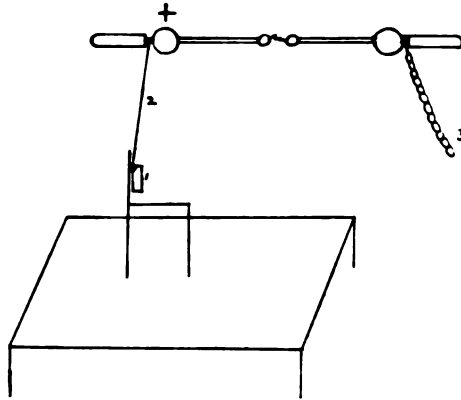


FIG. 15. 1, Metal electrode on patient. 2, Connecting wire. 3, Ground chain to water pipe.

(5) The negative pole of the machine is connected by a ground chain to the water pipe.

Its action is to increase metabolism. It is used in the treatment of obesity, gout, diabetes, anemia, chlorosis, and headaches, but is a poor substitute for the wave-current.

Auto-condensation is illustrated in Fig. 17, and is administered as follows:

(1) The poles of the machine are placed near enough to permit a discharging spark-gap.

(2) The patient lies upon an auto-condensation couch, which should be as insulated as possible, on which is a felt or rubber filled cushion under which is a metal plate 5 feet long by 16 to 20 inches in width. The patient's body must be equidistant from the edge of the couch in all parts, or a spark may pass from the metal plate to an exposed part.

(3) Place a metal electrode 6 by 8 inches on patient's abdomen or any selected region and connect the electrode with the positive pole of the static machine by a rheophore.

(4) Connect the metal plate beneath the cushion to the negative pole of the machine or connect the metal plate with a ground chain, in which case the negative pole of the machine should be connected to the earth by a second ground chain.

Another method of giving auto-condensation is as represented in Fig. 18.

(1) The balls of the poles are widely separated.

(2) Connect a rheophore from each pole of the static to the Leyden jar of the resonator.

(3) Connect the D'Arsonval attachment of the resonator with a milliamperemeter and connect the milliamperemeter with a metal plate on the patient's abdomen.

(4) Connect the D'Arsonval attachment of the resonator

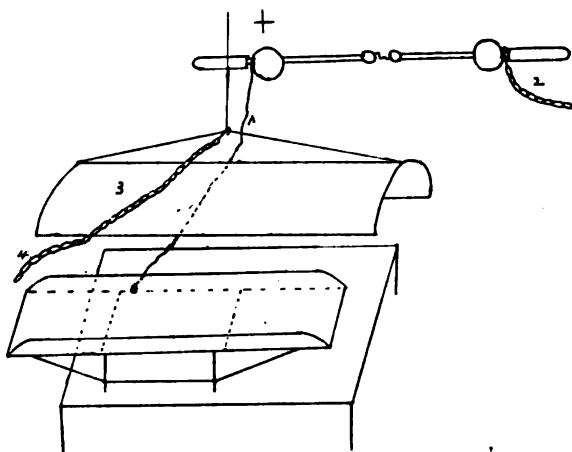


FIG. 16. 1, A wire connecting metal plate beneath felt cushion with the positive pole. 2, Ground chain to water pipe. 3, Suspended half cage. 4, Ground chain from half cage to gas pipe.

with the metal which is under the felt cushion of the chair on which the patient is lying.

Auto-condensation may be found useful in the treatment of tuberculosis, rheumatic and gouty affections, and atonic conditions. It promotes metabolism. Williams used 350 milliamperes ten minutes daily in the treatment of chronic rheumatism. In the treatment of atonic dilatation of the stomach auto-condensation and the brush discharge have been used.

The static machine is also a source of *the X-rays* for therapeutic or skiagraphic purposes.

Fig. 19 illustrates the method of making the connections:

(1) The poles of the machine should be widely separated.
(2) Connect the anode of the X-ray tube with the positive pole.

(3) Connect the anti-cathode of the X-ray tube with the negative pole. If the tube is low, a series spark interrupter, as the Files interrupter, will increase the volume of the radiations. The exposures, when the ray is used therapeutically, are usually for ten minutes, the tube being placed so that the anode in the center of the tube is 10 to 13 inches away, all parts except the parts under treatment being shielded. The X-ray has a cumulative action, so great care should be exercised not to make exposures after a pinkish reaction of the skin is noted. In such cases, by the use of light, as the Leucodescent lamp or

marine searchlight, or the white of an egg, the exposure may soon be resumed.

For radiographic purposes the time of exposure must be relative to the "quality of the tube, the density of the object, and the character of the apparatus employed." Therapeutically the X-ray is used in the treatment of epithelioma, carcinoma, sarcoma, acne, lupus vulgaris, lupus erythematosus, sycosis, and various skin affections, tubercular joints, and gumma tumors. For diagnostic purposes it is invaluable to the surgeon, general practitioner, and dentist.

Static electricity is not only invaluable therapeutically, but has certain points in its favor in the use of the X-ray. Both

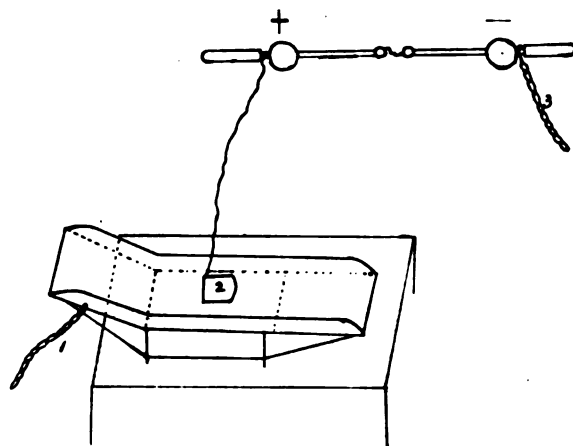


FIG. 17. 1, Ground chain from metal plate under felt cushion to gas pipe. 2, Abdominal electrode on patient. 3, Ground chain to water pipe.

the static and the coil have their particular advantages. As enumerated, according to Snow, static machines have the following advantages:

"(1) They are invaluable for other therapeutic purposes.

(2) They are relatively noiseless, easily adjusted, and not apt to suffer serious damage when in operation.

(3) High-vacuum tubes can be excited by them for long periods without serious damage or risk to the apparatus.

(4) Tubes last for a much longer time without material deterioration, and are not so apt to puncture.

(5) They do not require an electric current for operation, as hand, water, or other power may be utilized."

For X-ray work or the treatment of skin diseases or in the treatment of very stout people the larger machines have the preference. For general therapeutic work until recently the

8- to 10-plate machine, with its lower amperage, was preferred, but now the larger machines may be used with a new device—a shepherd's crook made of wood, having a brass crook and brass ball as terminals, and a slide connected to a long chain, which can be slid up or down on the crook, thus varying resistance and permitting leakage. The wave-current is thus administered with varying quantity and intensity by connecting

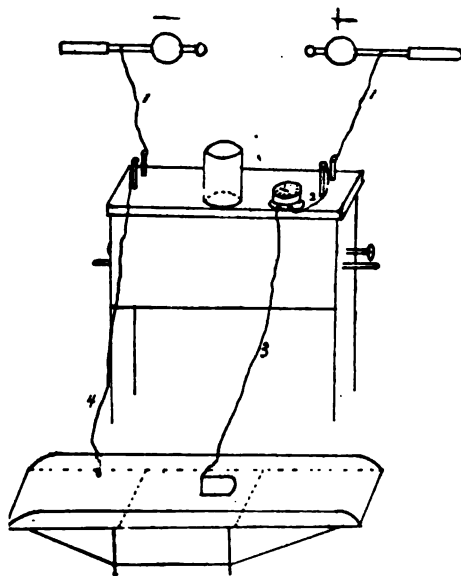


FIG. 18. 1, Wires from poles of static to Leyden jars. 2, Wire from D'Arsonval attachment to resonator to milliamperemeter. 3, Wire from milliamperemeter to metal electrode on patient's abdomen. 4, Wire from D'Arsonval attachment of resonator to metal plate under cushion.

the electrode with the slide by means of a rheophore. (See Fig. 20.)

From the above short sketch it will be noted that to give the static current due consideration requires time, thought, and attention to technique. Its field of usefulness is ever widening. Static work is yet in its infancy, but time with ever-increasing interest and development by professional men, who must recognize its worth by study and investigation, will develop the properties of the static and find in it one of the foremost factors in the field of therapeutics—a factor that every progressive physician of the future must have and understand or lose his clientèle, for static electricity is the treatment par

excellence of many ills that flesh is heir to and with other physical measures will be demanded more and more by the

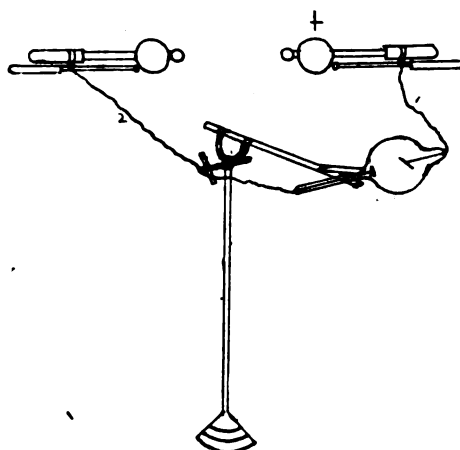


FIG. 19. 1, Insulated wire connecting the anode of the X-ray tube with the positive pole. 2, Insulated wire connecting the anti-cathode with the negative pole.

laity as the cloak of mystery is withdrawn from physical agents by those who use them intelligently and do the miracles which

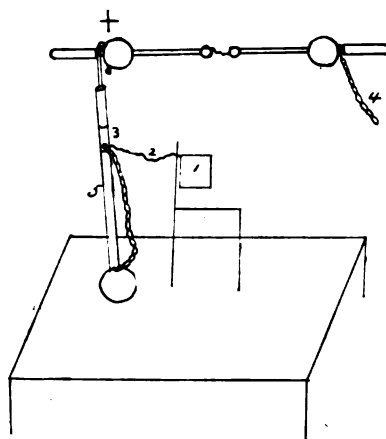


FIG. 20. 1, Metal electrode on patient. 2, Connecting wire. 3, Sliding sleeve of metal. 4, Ground chain to water pipe. 5, Shepherd's crook of wood and metal.

will not only open the eyes of brother practitioners but rob the quack of his golden wand.

349 West Fifty-seventh Street.

NEURASTHENIA AND ITS TREATMENT.

BY CHARLES N. DE BLOIS, M. D., TROIS-RIVIÈRES, CANADA,

Physician in Chief of the Institut Hydro-Électrothérapique, Trois-Rivières; Physician at St. Joseph Hospital, Trois-Rivières; Member of the American Electro-Therapeutic Association, Société Française d'Électrothérapie, Société Internationale de Médecine Physique; General Secretary of the Third Congress of the Association des Médecins de Langue Française de l'Amérique du Nord; Secretary for Canada, Third International Congress of Electrology and Radiology, Milan, Italy.

Neurasthenia which within the last thirty years has added another name to the old list of ills, is a disease of the nervous system, very common at the present time, and likely to increase.

It is not without reason that it is called "the Disease of the Century"; yet this appellation is hardly just, for it seems proved beyond gainsay by certain authors that the American nevrosity of Baird existed at all times and in all places. However this may be, our age is particularly fruitful of neurasthenics who may be met every day, especially in city practice. The present commonness of this disease is due, no doubt, to actual social conditions, and to the struggle for life which waxes fiercer day by day. We may add that neuroarthritic heredity and intoxications, especially alcoholic intoxication, justly claim for themselves a large share of the determining causes of the nervous disorders proper to our time.

What is neurasthenia? Neurasthenia, says Charcot, is a state of irritable feebleness of the nervous system. It is a nevrosity, that is to say, a purely functional nervous disease, and, for this reason, has no pathological anatomy.

Neurasthenia is again defined: a persevering weakness of nervous force. This nevrosity consists in a trouble of the nutrition of the nerve elements, which become slower in repairing the losses of the organism, inasmuch as they no longer accumulate sufficient vital energy and even use up the spare potential. Hence the designations: nervous exhaustion, nervous feebleness, which are often applied to neurasthenia.

Neurasthenia, in the general acceptance of the term, is not a morbid entity; it is a state, or rather, a medley of states which it is necessary to differentiate one from the other, since

they involve a diagnosis and a prognosis absolutely distinct.

Those facts have been brought out into light by Dr. Gilles de la Tourette, who concludes that there is not a neurasthenia but neurasthenic states.

In classes, there are true neurasthenics and false or hereditary neurasthenics.

Causes.—Prolonged vigils, excessive manual labor, mental overwork, troubles, emotions, sadness, great shocks (railway accidents, etc.), these are the principal causes of true neurasthenia. Sometimes true neurasthenia grafts itself upon organic affections. There is, besides, a nervous heredity which creates false or hereditary neurasthenia.

Symptoms.—Symptoms may be objective or subjective. The objective symptoms of neurasthenia may be none or few: indeed neurasthenics often look in the best of health.

The subjective symptoms are generally of the psychical order. They are:

(1) The neurasthenic headache. It is peculiar. It bears down upon the head as a heavy leaden mold, sometimes it is creeping and throbbing, sometimes bursting outwards so that the scalp would seem too small for the skull; again, it seizes the forehead and again, the sides of the temples, squeezing the head as in a vice. Waves of heat steal up through the face and center in pain around the eyelids and head. At times the headache ceases for a while, only to reappear. It is often worse during the night. There is nothing constant about it except its inconstancy and its certain recurrence.

(2) Vertigo. This, too, is peculiar. There is no falling down as in the disease of Ménière; but, rather, there is sensation of cerebral void with weakness of the lower members which have a tendency to give way beneath the weight of the body. The sufferer sees floating specks; everything appears gray and hazy.

(3) Pains. These have their seat in the back of the neck and down the spinal cord, localizing themselves at the level of the sacrum to form the *plaque sacrée* of Charcot. Pains, too, gather often around the heart and down either leg, alternating sometimes with the pains in the head. Shooting pains rush at times through different parts of the body. Sometimes creeping or throbbing pains seize every nerve cell. Topoalgia

frequent and obdurate. Like the headache, these pains are constant in their inconstancy.

(4) Feebleness of the lower members coincident with the *plaque sacrée* which has its seat in the sacrum.

(5) Absence of anesthesia. Patients feel the prodding of a pin at any point. There is no extinction of the reflexes. Patients are quite sensible to light and sound.

(6) Languor. Sufferers feel quite unfit though anxious for work. They listen indifferently. Their imperfect vision sends them often to the oculist. As a matter of fact there is nothing wrong with their sight, save perhaps a little accommodating asthenopy. To explain those phenomena it is only necessary to remember that the retina is an appendage of the brain. Neurasthenics often can neither read nor fix their attention.

(7) Insomnia. This is one of the most important and most frequent symptoms. Neurasthenics sleep poorly, sometimes only an hour or so, and their sleep is never refreshing.

(8) Gastro-intestinal phenomena. These are not dangerous. What ordinarily predominates with neurasthenics is slowness and difficulty of digestion. Rarely is there vomiting. They complain that their food remains in their stomach; their mouths are clammy, their appetites languishing. They experience disturbance in the intestines, etc. In those cases, it suffices, says Dr. Gilles de la Tourette, to treat the general state and everything will go well. He adds, besides, that in neurasthenia there is not generally gastric or intestinal trouble, properly so called; the stomach and intestines share in the depression and general asthenia of all the functions and nothing more.

(9) The mental state. The mental state of neurasthenics varies greatly. Some neurasthenics are excited, some depressed. It is ordinarily with the depressed that nervous afflux is deficient.

Weakness of will, anxious thought about all the organs, indecision in the presence of determinations to be taken, worry over trifles, suspiciousness, apprehensiveness, sensitiveness to remarks about their health, gloominess, discouragement, obsession by one idea, inaptitude for work—these are the most common characteristics of the mental state of those patients.

Judgment, on the whole, remains solid with neurasthenics; they are simply depressed, not devious.

Such, in résumé, are the chief symptoms of true neurasthenia

—the kind of neurasthenia that we consider in the course of this paper.

We give, in passing, the history of a true neurasthenia which we observed. One will see at a glance that the patient had cause to become neurasthenic; false neurasthenics have no similar cause for their disease.

Rev. Father X., aged forty-three years, had suffered from neurasthenia for fifteen years.

We know all his family; his father is quite strong; his mother is arthritic. Patient had no sickness in his infancy.

The actual affection developed in 1886, at the end of several years of teaching and extraordinary intellectual overwork. At that time he taught in a classical college. At length his assiduous studies brought on a sort of nervous habit which manifested itself by excessive impressionability, unmotivated sadness and repeated weakness with insomnia and disquietude. He had besides, palpitation of the heart, painful digestion, and divers intestinal troubles.

He underwent treatment for three consecutive years without any marked improvement, and was thereupon advised to give up teaching and to devote himself to active ministry in the country. This change effected an amelioration of health for some time, but at the end of nine years the old disorders returned with vertigo, headaches. Insomnia and stomach troubles were more frequent than theretofore. He showed irregularities of character, and saw floating specks. He was sad, depressed and incapable of work. At times, he said, his heart seemed to cease beating, and again, it beat with extraordinary rapidity. Finally, he had vasomotor troubles, abundant perspirations, with frequent coldness of feet and hands. What makes his case singularly instructive is that, like most other neurasthenics, he had consulted many physicians and oculists. Divers treatments were prescribed for him,—complete rest, isolation, distractions, voyages, etc. Those treatments, though excellent in themselves and possibly sufficient in many cases, brought him no sensible relief.

Some of the practitioners directed all their therapeutic efforts upon his stomach without taking into account his neuropathic condition. The result was that the patient seeing himself subjected to severe special treatment for his digestive organs (such as washing of the stomach, rigid diet, etc.),

believed he was attacked with organic disease of the stomach, and consequently only grew worse. He was thoroughly discouraged. Every medicine had been tried and none had been found effective. His disease increased to such a point that life for him was all but insupportable.

It was in this critical state that he entered the Hydro-Electro-therapeutic Institute at the recommendation of a distinguished physician, in another city. He entered the Institute on May 8, 1901.

The following treatment was immediately taken up: A cold douche of ten seconds every second morning, with a Scotch douche in the afternoons of the same days; the other days, a Scotch douche in the morning and a lower affusion in the afternoon; a static electric bath of fifteen minutes three times a week, and injection of artificial serum every second day. Prescriptions of iron, bromides of strontium and trional were superadded. Hygienic and moral treatment were brought into action.

May 16, the patient was already better; his sleep had improved.

June 1, the vertigo had diminished, and his digestion was getting into order.

July 5, the patient's headache had all but disappeared, he digested perfectly, his perspirations had ceased.

July 15, that is to say, after six weeks' treatment, he was able, owing to his constant daily improvement to leave the Institute, at our recommendation, to take a fortnight's trip.

September 3, he returned to the Institute to continue treatment for twelve days.

September 15, the patient quitted definitely the Institute, feeling perfectly cured. The treatment had lasted three months and one week.

We met this priest three years after he left the Institute. Not only was his cure an abiding fact, but he was bearing joyously the hardships of his apostolic work.

We make no comment upon this case, save only to point to the rapidity of the curative treatment applied to grave neurasthenia of fifteen years' duration.

This case is a good specimen of a true neurasthenic who had spent his nervous supply under the influence of excessive mental work.

Everybody that works overmuch with the head, exposes himself to become a neurasthenic. Neurasthenia is the disease of intellectual persons.

All true neurasthenics have experienced great cerebral fatigue; it is this brain fatigue that brings on neurasthenia. Antecedent diseases, as syphilis, rheumatism, etc., can sometimes produce nervous exhaustion.

False neurasthenics.—These have no cause to assign for their disease. In vain are they questioned; they have been neurasthenics from their infancy. Their disease has only become worse. It is the exaggeration of their habitual condition; it is the legacy of nervous heredity. Charcot calls false neurasthenics hereditary neurasthenics.

Treatment.

We shall now approach the therapeutic study of neurasthenic states. On this subject authors have given themselves wide fields. So many treatments are scheduled that the ordinary practitioner is often in a quandary to choose which is best to cure his patient.

Those uncertainties come from divers causes, the chief of which, hardly anyone can deny, is that the different recognized treatments claim a different pathogeny.

This pathogenic treatment of neurasthenia has been severely criticised by Dr. Brissaud, and we can hardly find fault with his criticism.

The multiplicity of drugs should be avoided, so far as possible, for there are no subjects, perhaps, that support drugs less readily than neurasthenics. If one could add up, say Drs. Proust and Ballet, the evil results of medicine, styled tonic and constitutional, and of the various hypnotics and pharmacæutic products with which the treatments that enter into daily practice are surcharged, one would be at a loss to determine whether neurasthenics are the debtors or the victims of medicine.

We have been called by a combination of circumstances altogether particular, as well as by our avocation of hydropathist and electro-therapist, to care for a great many neurasthenics. Some have been sent to us by physicians of Three

Rivers, Montreal, Quebec and other places in our own Province, as well as by physicians of Ontario, the Maritime Provinces, and the American States. We are happy to have here occasion to give expression to our gratitude towards those distinguished physicians.

(To be concluded.)



THE DIAGNOSIS AND TREATMENT OF RHEUMATISM AND ALLIED AFFECTIONS.

BY ALBERT C. GEYSER, M. D., NEW YORK.

Clinical Instructor in Radiography and Radiotherapy at Cornell University Medical College; Member American Medical Association, American Electro-Therapeutic Association, New York State Medical Association, Harlem Medical Association, Medical Society of the Borough of the Bronx, Medical Society of Greater New York, Manhattan Dermatological Society, etc.

Rheumatism is not a disease but a symptom. From the ancient Greek, whence this word rheumatism is derived, we learn that it was then looked upon as a symptom.

The Greek medical observers noticed that when the perspirations or alvine discharges were suddenly interrupted and the usual outflow of excrementitious matter delayed, that this condition frequently preceded a set of symptoms which they grouped under the term rheumatism.

To-day there seems to be no end to the symptoms popularly included under this term.

Writers of the present day believe that the symptom complex of rheumatism is due to "imperfect metabolism." Their opinion is based upon the fact that during such conditions, lactic acid as well as uric acid is found in the blood, it is their contention that uric acid should have been completely oxidized and discharged from the body as urea.

Metabolism is such a complex process and so difficult of comprehension, that we not only fail to clearly account for rheumatism by the term suboxidation, but simply cover the term rheumatism of which we know little by one of which we know less.

Metabolism signifies that change which constantly takes place in the intimate condition of cells whereby their molecules become more complex or contain more latent energy which

represents anabolism, or less complex and having lost or given off energy which is represented by katabolism, we see then that the word metabolism includes a constructive as well as a destructive process.

We realize at once the process, which provides nutritive material to the tissues for development, growth, support, secretion, and the liberation of force, and contra in receiving the products of waste for discharge by the regular excretory channels, is most perplexing.

Had we only the laboratory chemistry of this process to deal with, then indeed much might be accounted for, but the one obstacle in our way is the fact that each cell is a living thing, an entity that plays a most important rôle in the chemistry of the body.

The cell theory was first definitely established by Swann in 1839, who demonstrated that tissues of animals and plants consist of cells, which are developed from pre-existing cells, and are usually connected with one another by processes.

In 1858, nearly half a century ago, Virchow in his "Cellular Pathology," promulgated the now accepted dictum, that every animal appears as a sum of vital units or cells, each of which exhibits in itself all the characteristics belonging to life. The composition of the larger body, of the so-called individual must then depend upon a social arrangement of all the individual cells of the body. The chemical changes in the human body which take place during the process of metabolism are cleavage or splitting up and oxidation into end products. This is however a chemic, mechanic, and most of all, a vital process. We may be able to explain to our satisfaction the first two, but the vital process is and seems to remain the mystery it always was, is now, and I dare say always will be. Neither scientist nor artificer has ever been able to reproduce one of the simplest phenomena of this process, namely, the office the blood stream plays in the process of metabolism. It is at once the avenue of the supply of life products intended for the upbuilding, and at the same time furnishes the means of removal of waste products; two diametrically opposed functions carried on by the one agent in perfect harmony.

Every pathological condition has its origin in a disturbance, either from within or without, affecting in some manner this metabolic process.

All matter that enters the body must again be accounted for either in tissue, growth, energy, or waste products and these waste products must again leave the body by one or all of the four channels; the kidneys, intestines, lungs, and the skin; while certain important deductions may be made from close examinations of the end products of metabolism by the science of chemistry, as performed by us in the laboratory, yet we cannot take into consideration the part enacted by the living cell in this process. It is for that reason the explanation of faulty metabolism must fall short in at least one point, but at the same time the most important one under consideration.

Infectious Nature of Rheumatism.

There are several good reasons why this condition should be looked upon as infectious in its nature. (1) From good observers we learn that undoubted epidemic manifestations have been recorded; in London epidemics were prevalent in 1868, 1874, and 1884, in the same family several cases occurring at the same time. (2) It is self-limited,—without treatment a patient will suffer for about six weeks when the symptoms gradually subside. (3) It seems most commonly to attack those who appear to be in otherwise good health. (4) The more severe symptoms, especially the complications, show the same conditions as other well known infectious diseases, the joint symptoms being common to a number of infectious diseases as, scarlatina, cerebro-spinal meningitis, specific urethritis, typhoid fever, etc. (5) Several times the statement has been made by different observers that a specific germ had been found in the blood and joint effusions, but these several observers worked with different germs; thus a diplococcus found on several occasions in the synovial fluid in patients who were suffering from rheumatic chorea, when inoculated into rabbits produced twitching and joint affections. More than a dozen different germs have at one time or another been found and each one when isolated and cultivated gave some one of the symptoms usually found in this affection. It may therefore be assumed that infection with any one particular germ does not quite explain the symptom complex of rheumatism, and the infection theory therefore lacks some vital points in its conclusiveness.

There is, however, one point at least upon which all ob-

servers are agreed, and that is, that there is "a something" circulating in the blood stream or retained in the tissues which should have been eliminated. It has also been clinically demonstrated that the disease is absolutely curable by processes which tend to eliminate from the body, combined with methods which hinder the intake of certain substances into the body.

The term rheumatism ought to be, and will eventually be, restricted to a very narrow meaning. At present it acts as a cloak for a multitude of ailments and by the generous size of the cloak is capable of covering a multitude of ignorance. Nevertheless the word usually signifies a condition in which three sets of symptoms at least are predominant.

(1) General or constitutional symptoms.

(2) Localized lesions in the joints, muscles, and skin.

(3) A marked tendency toward the establishment of inflammatory lesions of mucous and serous membranes and certain visceral organs.

One point should here be mentioned, while it is not a symptom, but it is so frequently observed, that it is entitled to our recognition, and that is the part that heredity plays in this disease.

It is customary to divide most diseases into three stages, acute, subacute, and chronic, which practically would mean that if a patient had been seized for the first time with this disease, it was an acute attack or was suffering from acute rheumatism; if the symptoms, more or less, disappear and he suffers from a second attack, plus the results of the first, then, he is suffering from subacute rheumatism; if these symptoms more or less disappear and he suffer from a third attack, plus the results of the first and plus the results of the second attack, then he is suffering from chronic rheumatism.

A patient may, however, suffer from acute rheumatism all his life, assuming that the proper remedial measures were made use of at the first attack, but the cause of the first attack is again operative or has never been removed.

Etiology.—*Sex.*—There is practically no difference; both sexes are equally liable under similar circumstances; but in early childhood more cases of acute rheumatism are noticed among female children, while in the adult, about the same preponderance exists in the male. It does not seem difficult to account for this. The average female child is more delicate

than the male, first by natural sequence, second the male child spends more time in muscular exercise in the open, thereby securing better oxidation and elimination, hence the greater freedom from the disease. The influence of occupation, exposure, and the general disregard for hygiene, seem to account for the fact that in later life the male adult furnishes the greater number of sufferers.

Nearly eighty per cent, of all cases occur between the twentieth and fortieth year, twenty per cent, are about evenly distributed between infancy and after the fortieth year.

Rheumatism is a disease of the temperate zone; seldom seen in the tropics; common in cold and damp climates.

Sudden changes seem to have an unfavorable effect upon chronic rheumatism, therefore more cases develop during the spring and fall of the year.

Constipation or checking the eliminations from the skin and kidneys seem to be important factors in the production of rheumatism.

Perhaps the oldest, commonest, and most studied of all diseases, yet even modern pathology fails to give satisfactory explanation as to the cause. The chemistry of the blood helps but little. The presence of lactic acid in the blood or the increased amount of uric acid can only be accounted for through either faulty elimination, faulty absorption, or perverted metabolism.

One thing remains, something is circulating in the system which possesses a selective action upon the fibrous tissues of the body.

Nowhere is this more strikingly manifested than in the inflammatory reaction which promptly takes place in all fibrous structure; it makes but little difference whether this fibrous tissue is located in joints, tendons, fascia, or the serous membranes as the pleura and pericardium or even the fibrous substance contained in nerve tissue.

I believe that from the foregoing a hypothesis can be evolved that at least seems to harmonize with all the conditions enumerated, and yet antagonizes none. Last, but by no means least, clinical experience bears out one fact, viz: patients suffering from the symptoms we term rheumatism in any of the varied grades and forms, recover promptly, relapses are not frequent

and when they do occur are amenable to treatment before severe organic changes can manifest themselves.

My hypothesis is that the symptom complex of rheumatism in any form is the same thing under different conditions.

It is essentially an autotoxemia, usually of intestinal origin, but may originate from the respiratory apparatus including the tonsils, causing a lowered resistance of some organ or organs, followed by the invasion of germs of various kinds, finding a suitable habitat at the particular locus minoris resistentiæ, from there either by the blood or lymph channel effecting a general invasion, the toxins elaborated in the system possessing a predilection for all fibrous tissue, hence the general constitutional symptoms, the local lesions, and finally the changes in all tissues of a fibrous nature.

The symptom complex of rheumatism indeed occupies a wide range—over thirty different varieties. I will mention a few: R. apoplectic, R. articular, R. diaphragmatic, R. neuralgic, R. periosteal, R. synovial, R. venereal, R. syphilitic, R. visceral, R. pectoral, R. scarlatinal, R. cerebral, R. infectious.

The above selection is made for the purpose of showing that rheumatism may appear in any part of the body, in any tissue as well as associated with any disease, in fact as stated in the hypothesis, that rheumatism in general is one and the same thing, differing only as to the nature of the toxemia and the organ or parts involved.

Assuming that the above hypothesis is a correct one, it would then be necessary to be able to point out the exact mode of entrance, or the original "locus minoris resistentiæ." This I am pleased to say can be accomplished with an exactitude that is surprising.

Having once located the particular tissue or organ involved we would arrive at the underlying cause or, as we prefer to term it, the diathesis.

Let us for a moment imagine that a patient presented himself with the various symptoms of rheumatism, general fever, painful and swollen joints, as well as visceral complication. Suppose that we were enabled to say with some degree of certainty that his underlying cause was indigestion, we would have every reason to assume that no matter how the rheumatism was treated, we could at best only expect a temporary abatement of the symptoms; while if the underlying cause of indigestion

were removed, we could hope to relieve the rheumatic symptoms without much further treatment and would very likely have no recurrence, so long as the digestive apparatus would remain normal. Suppose a patient presented all the symptoms of what is known in literature as rheumatic appendicitis, if we could diagnose that to a reasonable certainty, we could direct our treatment towards the offending underlying cause, the condition of the appendix and surrounding tissue; thereby not only cure the patient of his rheumatism, but perhaps prevent later, after repeated attacks, an operation for appendicitis.

It often happens that a patient with a malarial history is suddenly seized with constitutional symptoms, which in a few days or even hours localize themselves in the left hip or the entire left lower extremity, when it is either diagnosed as rheumatic hip or sciatica, an equally vague and uncertain term; when in reality we are dealing with a malarial toxemia, which might easily have been diagnosed; the underlying condition treated when the rheumatic hip-joint or sciatica would be a thing of the past.

Again, supposing a patient suffered from the symptoms of gonorrheal rheumatism, but denied all previous infection, nothing could be gained by treating the rheumatic symptoms, without first treating or removing the cause, the original specific urethritis.

Here again, if we possessed the means, early, in this stubborn disease, to accurately, without even the co-operation of the patient, diagnose the disease in the genito-urinary tract as the original starting point, much valuable time could be saved; how much more reliable would our therapeutic measure be and with what assurance could we give a more favorable prognosis. I might go through the entire list of rheumatic symptoms, we would find each and every time some underlying cause, some organ or organs primarily involved, while upon a return to normal of these organs a cure of all the symptoms grouped under the term rheumatism could be reasonably anticipated.

(To be concluded.)

Editorial.

MECHANICAL VIBRATION IN DIAGNOSIS AND THERAPEUTICS.

THE employment of mechanical vibration as an aid to diagnosis fills a place the value of which is certain to be established in the near future. The passage of an applicator in vibration with varying pressure between the transverse processes along the two sides of the spinal column reveals conditions of tenderness referable to organs or structures receiving their nerve supply from the corresponding spinal nerves or the sympathetic ganglia through the rami communicantes, as do also vibrations over congested organs. Associated with these sensitive and congested areas are also regions of muscular contraction. The relations of these regions of tenderness to other conditions as to cause or effect, or their exact bearing on one another, while to a degree indefinite, are so closely associated that the relief of either tends to the disappearance of the other, demonstrating their relation as part of the *symptom complex*. When it is fully appreciated that an intimate relationship exists between these conditions and that their removal can in most cases be effected by the vibrator in association with other mechanical methods a revolution will be instituted in many therapeutic procedures, as well as a changed notion concerning the management of a large number of functional derangements.

The profession must sooner or later recognize these facts or expect the public, who are finding out the truth, to patronize to a large degree the manual manipulators who make a hobby of spinal manipulations, affecting a part of the symptom complex but failing ultimately in most cases to eradicate the entire condition, as do also the practitioners who fail to recognize the importance of the mechanical treatment.

On the other hand, those who make application of mechanical vibration or kinesitherapy generally to the exclusion of other physical measures or other indicated measure, will fall short of the success otherwise to be attained.

Broad-gauge intelligent recognition of all that is good and its employment in its proper place and manner, with an untiring energy and determination to do what is right for humanity's

sake, has been and must continue to be the policy of the great medical fraternity.

* * *

THE EMPLOYMENT OF STATIC MODALITIES IN ORGANIC CONGESTIONS.

WHEN it is realized that in every instance organic congestion arises from some irritation, active or passive; that the resulting associated stasis in most cases persists often permanently, after the cause is removed, forming a nidus which impairs function and induces varying degrees of discomfort and constitutional disturbance; two indications are apparent: (1) removal of the cause, and (2) the removal of stasis and the other products of inflammation.

In most non-infective congestions the cause is transitory, but the effect—local stasis—persists, as a chronic condition and functional derangement becoming the starting-point for a vicious circle. When habit or environment adds, little though it be, to the conditions but constantly, stasis not only persists but extends, and a distinctive degenerative process is established. It is apparent therefore that the first step for the restoration of function is the re-establishment of circulation which must follow the energetic removal of inflammatory exudates—the removal of local stasis. Even if habits are corrected, stasis once established complete recovery is long deferred, unless relieved by mechanical intervention. Prolonged administrations of heat, cold, or static electricity relieve stasis without irritation, while mechanical vibration and massage leave varying degrees of irritation. The static modalities effect the relief of local stasis with a minimum of irritation and maximum of energy and penetration. They affect the protoplasm and with it the mass it comprises to deeply seated regions, effecting cellular and mass contraction. When administered in a manner to give periodical release or relaxation intermitting with the periods of contraction, it is possible to completely remove regions of congestions, relieving stasis, removing the infiltrate, and instituting circulation and repair. In any organ the site of a non-infective inflammatory process without the presence of degeneration or hyperplasia, the structures will be restored to normal.

The remarkable results obtained in the treatment of prosta-

titis, dysmenorrhea, subinvolution, and liver, pancreatic, splenic, thyroid, and other organic congestions by this energetic method are revolutionary.

* * *

SIXTEENTH ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSO- CIATION.

The Sixteenth Annual Meeting of the American Electro-Therapeutic Association will be held in Philadelphia on the 18th, 19th and 20th of September, 1906.

Arrangements have been made by the Committee on Arrangements whereby a rebate will be given by the railroads if the members and other visitors take the proper course as directed, in the following notice. This applies to all parts of the United States and Canada east of and including Pt. Arthur, Sault St. Marie, Sarina, and Windsor, Ont.

OFFICIAL NOTICE OF REDUCED FARE TO THE PHILADELPHIA MEETING.

A reduction of fare and one-third, on the certificate plan, has been secured for those attending the meeting of American Electro-Therapeutic Association, at Philadelphia, Pa., September 18-20.

The following directions are submitted for your guidance:

(1) Tickets at full fare for the going journey may be secured within three days (exclusive of Sunday), prior to and during the first two days of the meeting. The advertised dates of the meeting are from September 18 to 20, consequently you can obtain your ticket not earlier than September 14, nor later than September 19.* Be sure that, when purchasing your going ticket, you request a certificate. Do not make the mistake of asking for a receipt.

(2) Present yourself at the railroad station for ticket and certificate at least thirty minutes before departure of train.

(3) Certificates are not kept at all stations. If you inquire at your station you will find out whether certificates and through tickets can be obtained to place of meeting. If not, agent will inform you at what station they can be obtained. You can purchase a local ticket thence, and there take up a certificate and through ticket.

(4) On your arrival at the meeting, present your certificate to Dr. Albert C. Geyser.

(5) It has been arranged that the special agent of the Trunk

* Except from stations from which it is possible to reach place of meeting by noon of September 20, tickets may be sold for morning trains of that date.

Line Association will be in attendance to validate certificates on September 19 and 20. A fee of 25 cents will be collected for each certificate validated. If you arrive at the meeting and leave for home again prior to the special agent's arrival, or if you arrive at the meeting later than September 20, after the special agent has left, you cannot have your certificate validated and consequently you will not get the benefit of the reduction on the home journey. No refund of fare will be made on account of failure to have certificate validated.

(6) So as to prevent disappointment, it must be understood that the reduction on return journey is not guaranteed, but is contingent on an attendance of not less than one hundred persons holding certificates obtained from ticket agents at starting points, showing payment of full first-class fare of not less than seventy-five cents on going journey, provided, however, that if the certificates presented fall short of the required minimum and it shall appear that round-trip tickets are held in lieu of certificates, they shall be reckoned in arriving at the minimum.

(7) If the necessary minimum is in attendance, and your certificate is duly validated, you will be entitled up to September 24 to a continuous passage ticket to your destination by the route over which you make the going journey, at one-third the limited fare.

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PROGRAMME OF THE SEVENTH ANNUAL MEETING OF THE AMERICAN ROETGEN RAY SOCIETY, NIAGARA FALLS, N. Y., AU- GUST 29, 30, 31, 1906.

"President's Address," Henry Hulst, M. D., Grand Rapids, Mich.; "Coils," H. C. Snook, Philadelphia, Pa.; "Technique of Radiography of the Head," E. W. Caldwell, M. D., New York, N. Y.; "What Should Be Taught Medical Students Concerning the X-Ray?" Vernon Willey, M. D., Ann Arbor, Mich.; "Localization of Foreign Bodies in the Eye," C. F. Bowen, M. D., Columbus, Ohio; "Diagnosis of Calculi," Frederick H. Baetjer, M. D., Baltimore, Md.; "Radiography of the Cranium," Augustus W. Crane, M. D., Kalamazoo, Mich.; "Further Researches in X-Ray Filters," G. E. Pfahler, M. D., Philadelphia, Pa.; "A Roentgenological Study of Certain Manifestations of Syphilis," Percy Brown, M. D., Boston, Mass.; "The Roentgen Treatment of Tubercular Glands," Ennion G. Williams, M. D., Richmond, Va.; "The Present Status of Radio-Therapy," G. H. Stover, M. D., Denver, Col.; title of paper not yet supplied, Chas. Lester Leonard, M. D., Philadelphia, Pa.; "Acne and Mycosis Fungoides," Russell H. Boggs, M. D., Pittsburg, Pa.; "Leukæmia and Other Diseases

of the Blood and Blood-Making Organs," H. K. Pancoast, M. D., Philadelphia, Pa.; "The Possibility of Formulating a Standard of Radio-Activity," C. E. S. Phillips, London, Eng.; "The Advantages of the Use of X-Ray Filters in Radio-Therapeutics," Reginald Morton, M. D., London, Eng.; "The Ultimate Result of the Roentgen Treatment of Carcinoma of the Breast," Geo. C. Johnston, M. D., Pittsburg, Pa.; title of paper not yet supplied, Lewis Gregory Cole, M. D., New York, N. Y.; "Roentgen Ray in Orthopedic Surgery," R. Osgood, M. D., Boston, Mass.; "Malignant Growth of the Bladder Treated by Roentgen Ray," A. L. Gray, M. D., Richmond, Va.; "A Résumé of the Radiometric Dosage in X-Ray Therapy," Mihran K. Kassabian, Philadelphia, Pa.; "Acne, Psoriasis, and Eczema," Andrew P. Biddle, M. D., Detroit, Mich.; "Lupus Vulgaris," H. W. Van Allen, M. D., Springfield, Mass.; "A New Direct Reading X-Ray Meter," Geo. C. Johnston, M. D., Pittsburg, Pa.; "A Report upon Experimental Work Done with the Roentgen Ray Filter," G. E. Pfahler, M. D., and J. F. Schamberg, M. D., Philadelphia, Pa.; "The Measurement of the Diameter of the Female Pelvis by Means of the Roentgen Ray, and New Technique in the Localization of Vesical Calculi," G. E. Pfahler, M. D., Philadelphia, Pa.; "The Action of the Roentgen Rays upon the Central Nervous System," Prof. Dott. Carlo Colombo, Rome, Italy.

Progress in Physical Therapeutics.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

The Principal Factors in Radio-Therapy and Radium Therapy.

By Dr. J. Belot, Archives of the Roentgen Ray, July, 1906.

The writer first reviews the observations of the early experimenters of the X-rays. He observes that in the measurement of any luminous source "there are two factors of primary importance—the quality of the radiations and the quantity emitted per unit of time," and subsequently adds that "The two principal factors in radio-therapy are, then, (1) the quality of the rays emitted by the focus tube, and (2) the quality of rays absorbed by the tissues." He then considers the well-known principles of radiation in tubes of different vacuum under currents of various potential and quantity. The various means of measurement follow in which he states that he "has proved by photographic means that when rays of medium penetration (No. 5 Benoist's scale) are used, tissues 1 centimeter thick absorb 50 per cent of the incident rays, whereas with less penetrating rays the fraction absorbed rises to 70,

80, or even 90 per cent." These results show that at a depth of 1 centimeter the histological modifications are much diminished and that at a depth of 2 centimeters they are no longer appreciable. The investigations were made on a neoplasm treated by the usual procedure. He concludes that it may be taken as proved "that with rays of great penetration the decrease of intensity of the rays with depth is not so rapid as with the less penetrating rays."

"As regards the radiations from radio-active bodies, it seems hopeless to expect any marked action on the deeper layers unless the active body is introduced into the substance of the tissues themselves."

The writer employed Holzknecht's apparatus as a means of measurement and dosage, and gives the following general rules which should govern the matter of dosage:

(1) The full therapeutic dose should be given in a single application, as long as this does not exceed the dose which usually determines reaction of the integument. This dose corresponds to 5H on Holzknecht's scale.

(2) If a larger dose is required, a dose should be given at each sitting which is the maximum dose compatible with the integrity of the integument, each irradiation being separated by the minimum interval necessary to secure this integrity.

He warns against the too prolonged administration of the Roentgen ray, and cites as an instance cancer of the breast which has been irradiated for a year or more, when suddenly a reaction follows characterized by phlyctenulæ appearing on the surface of the region under treatment from which arose "a blackened serous discharge" with here and there ulcerations.

In the writer's judgment the cause of this condition is the obliteration of the vessels of the irradiated areas consecutive to an endarteritis which has been produced by the ray.

The X-Ray Treatment of Ringworm. Br. Med. Journal, April 28, 1906.

Dr. J. Goodwin Tomkinson writes that he is fully convinced of the value of the X-ray treatment of ringworm. He is an advocate of the radiometer X of Dr. Sabouraud.

Under this system of measurement the single massive dose treatment is employed. It is admitted that accidents of permanent alopecia on account of dermatitis have occurred prior to and one since the introduction of the method. It is reported that Sabouraud has cured 586 cases by this method.

It can be easily understood that in a large clinic where a large number of cases come under observation, with the evident difficulty of maintaining an uninterrupted course of short treatments, there is a temptation and partial excuse for the adoption

of the massive dose of X-rays, but in private practice it is not likely, when the risk of the massive dose is appreciated, that the profession at large will be willing to pursue that course when the regulated small dose administered at regulated intervals will accomplish the same result.—[Ed.]

Local Treatment of Prostatic Hypertrophy with Radio-Active Mineral Water. By Altman in Wein. Klin Woch.

The writer refers to the successful results obtained by Moskowitz and Stegmann with the X-rays in the treatment of enlarged prostate. He has investigated the list of the German radio-active waters, injected straight from the spring into the bladder or rectum or both, according to indications. The German water is raised to the body temperature and irrigation may be continued for hours with the patient in the lateral position.

During the first-week treatment or, more rarely, the second, a severe reaction occurs, accompanied by depression, vertigo and circulatory and gastro-intestinal disturbances. The local symptoms are swelling and tenderness of the prostate gland, aggravation of the radiating pains, dysuria, turbidity of the urine and hematuria, which seldom lasts for more than two days and is not accompanied by fever. The effect is almost invariably followed by rapid improvement. The writer believes the cause is probably toxemia from the absorption of the products of glandular disintegration. The prostate becomes reduced in size through atrophy of its glandular elements, especially if the hypertrophy is of an adenomatous type, the bladder unless completely paralyzed regains its tone, and cystitis is improved by bactericidal action of the emanations. The micturition becomes normal or improves. The anatomical improvement in the gland is not necessarily parallel to the functional improvement in the symptoms and occasionally though the gland shrink, functional improvement may not occur. The treatment is contraindicated in advanced sepsis, profuse hemorrhages, and destructive renal changes.

RADIOGRAPHY.

EDITED BY HERMAN GRAD, M. D.

The Early Diagnosis of Pulmonary Tuberculosis by the Roentgen Ray. By A. Stanley Green, M. B., B. S., British Medical Journal, March 17, 1906.

The writer quotes the statement of Dr. Theodore Williams that "there are a large number of cases where the presence of the disease is discovered by the ordinary method of examination, but is not shown by an X-ray examination." This statement

is based on his experience gained in the clinics of Dr. Greg, at the Brompton and St. Thomas Hospitals, and upon the evidence of French physicians. The writer states that the examination by the X-ray must be thorough and by this he means:

"(1) The screen examination must be carried out in a perfectly dark room; the light in the tube must be under such perfect control that slight variations in trans-radiancy can be easily detected; the patient must be examined 'screen to back,' 'screen to chest,' and 'lateral oblique'; if the screen is covered with ground glass the movements of the diaphragm can be recorded and measured, and any shadows that are seen can be roughly traced and compared with those seen in the skiagraph.

"(2) The skiagraph must be taken, developed, and interpreted by the expert himself; I lay stress on this because I am satisfied that a good deal can be seen in the early stages of development that is difficult to detect in the fixed plate, and this is especially the case in the early cases where the lesion is limited to one apex. I am not for one moment suggesting that Dr. Greg's method of examination is not thorough, but I know that in many clinics the development is left to others. It may be said that this involves a great deal of trouble, but with practice the examination can really be carried out very quickly."

FOREIGN NEWS AND ABSTRACTS.

EDITED BY AMÉDÉE GRANGER, M. D.

Indications for Radio-therapy in Skin Diseases.—Discussion on Radio-therapy at the Last Session of the French Society of Dermatology and Syphilography.—Presided over by Dr. M. A. Fournier.

Dr. N. J. Belot: To establish indications and contra-indications for radio-therapy it is necessary not only to eliminate the cutaneous sarcomas, but to make a distinction between the types of cutaneous epitheliomas, as these do not all behave in the same manner, and even then it is not possible to state with precision the causes of some of the failures of the method.

Undoubtedly the histological characteristics must be taken into consideration. The researches of Dr. Darier have shown that spino-cellular epitheliomas are not as favorably influenced by the rays as the baso-cellular ones; but he did not believe that we were justified in proscribing this method of treatment in all cases of spino-cellular epitheliomas.

As a matter of fact, some neoplasms belonging to this type have been cured by radio-therapy. Besides, the histologic diagnosis is not always possible, and it does seem that for the present, at least, the indications or contra-indications should be based upon it alone.

He attaches more importance to the clinical type, the evolution, and especially the extension of the growth in depth.

According to Holzkmehcht (Vienna) all epitheliomas limited to the skin would always be cured by radio-therapy; the author admits that for his part he had always seen the cases treated by himself get well, on condition that their evolution had been slow.

Whether the neoplasm manifests itself by an ulceration with more or less raised and indurated borders, or by a tumor covered or not by tegumen, it is possible to obtain a retrogression and cicatrization by well-conducted treatment. It goes without saying that in certain fungous epitheliomas there is every interest in shaving down the surface, in preparing the ground by curettage; in that way an excellent result can be obtained more rapidly. The technique of the applications depends upon the same factors.

If the lesion has extended beyond the derma, this method has a certain percentage of failures. The result will depend upon the extent and depth of the lesion and especially upon the rapidity of its growth.

He believed that rapidly growing epitheliomas should be first treated surgically, if this intervention is possible; this to be immediately followed by a course of radio-therapy. In these cases, radio-therapy is not, as has been said, a dangerous method. It is simply impotent, and on that account could make the patient lose the benefit of an early ablation.

As to the inoperable cases, no one can doubt the happy influence, both locally and generally, which the X-rays exert upon them. When cure is not possible, it will furnish a degree of improvement which no other method can give.

A few cases of melanotic epitheliomas have been treated with success by this new method, but the usually rapid growth of this morbid type often necessitates surgical intervention.

Epitheliomas of the mucosa, and particularly those of the inferior lip, can sometimes be cured by radio-therapy. There exist some undisputed cases of cure, but numerous are those in which the method failed, and he has seen a goodly number in his own practice.

He believes, therefore, that for the present it is best to follow the surgeon's advice, then to follow the surgical intervention by radio-therapeutic application. He advised the same method of procedure in lingual cancers.

The X-rays have been accused of aggravating cutaneous neoplasms which had been submitted to their influence. In his opinion, instead of always blaming the radiations themselves, it would be wise to look for a defective technique as the cause of most of the failures and accidents.

He recognizes the fact that certain lesions are not modified, that their growth is not arrested, but he believes that aggrava-

tions are most frequently due to injudicious applications or to a secondary infection.

Each time that an epithelioma is to be treated, the patient should be carefully examined, the existence or not of metastases should be sought with care, and a prognosis made, taking into consideration the possible failure of radio-therapy. He is convinced that this practice would prevent many unpleasant surprises.

Competent observers have seen the appearance of large ganglions or the increase in size of pre-existing ones, after a few mild irradiations made to ulcerated epitheliomas. He had personally seen that occur once; it was a case of voluminous inoperable epithelioma of the lower lip, which he was treating by the method recommended by Pertles.

A submaxillary ganglion, which existed before the treatment, became painful and rapidly increased in size. Whether this increase was due to the treatment or to a superimposed infection, he was not prepared to say.

Side by side with this observation he could cite several cases in which ganglions accompanying voluminous epitheliomas diminished in size and then disappeared under the influence of the rays. This induces him to say that treatments should always be begun by acting upon the ganglions which are involved; other ganglions which are thought to be involved, even if they show no symptoms, should be rayed also.

It is certain, however, that some ulcerated cutaneous epitheliomas have been aggravated by a too severe treatment. An ulcerated epithelioma with raised borders is subjected to irradiation; the treatment is begun by a few large doses. The ulcer is transformed, takes on a better aspect, the base is cleaner and a cure is expected, when, one day, without apparent cause, the wound becomes painful, the ulceration becomes deeper, the bottom develops a greenish hue, black in some spots. Glandular enlargements sometimes develop. The lesion is manifestly aggravated. An epitheliomatous ulceration has been transformed into a Roentgen ulceration. No epitheliomatous cells exist at the bottom of the ulcer; morbid cells are only found at the periphery of the wound in the hard indurated edges. What is done? The treatment is continued, sometimes the dose of the X-rays is increased, and the disease which it is sought to cure is being aggravated more and more. Repair cannot take place, the young cells have been destroyed, the granulating base of the wound has been changed into a slough. He has seen one or two cases in which these phenomena were very well illustrated. Therefore, for a long time, he takes the precaution, not only to insure the uniformity of the irradiation upon the whole diseased surface, but as soon as he sees a change in the appearance of the ulcer, he protects it by a piece of lead-foil, properly cut; then he rays

the borders, which require a more intense treatment for their retrogression, and from time to time he applies a small dose to the ulcer, according to its appearance.

He presented a patient who had been so treated, and the result fully justified the procedure.

It is also imperative to prevent secondary infection if possible, because a suppurative process on a rayed surface causes the benefits which had been gained to be temporarily lost.

Finally, he regards, if not as dangerous, at least as uselessly fastidious, the method which consist in making daily or tri-weekly applications of feeble intensity, and to follow this practice until the appearance of local reaction. Admissible at a time when no means of measuring the radiations existed, there is no reason for its existence to-day. He believed there was every advantage in beginning the treatment with medium doses (4 to 5 H) if the epithelioma is not ulcerated, and with stronger doses (8 to 9 H) if the lesion is ulcerated.

Depending upon the quantity of radiation absorbed, the progress of the lesion, the reactionary changes, the interval between the application will be longer or shorter, the dose administered increased or diminished.

With Dr. Leredde he expresses himself against a formula which would be too simple and uniform. The treatment of each patient will depend upon his condition; there exists no unique method; different technic, suited to the individual case under treatment, must be resorted to. He has already insisted upon this point in his recent work on radio-therapy.

The penetrability of the X-rays must also be taken into account, as the amount of absorption in different layers of the tissues bears a direct proportion to the degree of penetration of the radiations.

If too feeble doses are ineffective, excessive ones may cause marked aggravations, the cause of which is not often recognized by radio-therapeutists.

Dr. Leredde—Radio-therapy is dangerous and contra-indicated: (1) In rapidly growing epitheliomas; (2) in extensive epitheliomas; (3) in melanomas. In the second place radio-therapy should always be well administered. The proper meaning of the word radio-dermatitis has caused a great deal of confusion. A painful and persistent radio-dermatitis must, when possible, always be avoided, but one can and should employ in cutaneous epithelioma doses just short of producing it (say 10 to 12 H) every twenty days. Of course the application must be more severe whenever the epithelioma under treatment is voluminous and thick.

He further stated that although it was certain that radio-therapy had destroyed and completely cured certain subcutaneous epitheliomas and some melanomas, he did not think that we were justified in making use of it to the exclusion of

surgery as long as we are unable to distinguish the growths that are curable by radio-therapy from those that are not.

Indications and Technic of Radio-Therapy in Muco-Cutaneous Epitheliomas.

dis by Ho up
Gaston proposed the following important questions for discussion: Should all muco-cutaneous epitheliomas be treated by radio-therapy? What types should be especially so treated? Should the treatment be applied?
On one hand the cure of epitheliomas by the X-rays depends on the situation, shape, and nature of the epithelioma itself; the condition of the patient, especially his age, the existence of local and general infections or intoxications; on the other hand, the technic employed is of considerable importance.

After careful consideration of the different methods of treatment in vogue: methods employing heavy, medium, or small doses; in the face of the aggravations and ganglionic involvements which sometimes occur without any apparent cause, he proposes the following technic: make a trial irradiation of the whole surface, causing absorption at that séance of the maximum dose of X-rays (say 5 H), wait three weeks; if no reaction follows, make séances every six to eight days, giving each time 2 1-2 to 3 H, until the total dose of H which previous experience demonstrated to be necessary for a cure of similar cases has been administered.

Dr. Bissière: In the radio-therapeutic treatment of skin epithelioma, the question of dosage plays the most important rôle. It is necessary to have absorbed by the region under treatment, at each application, a dose sufficient to produce an efficient therapeutic reaction; it is also necessary that the total dose absorbed be large enough to produce a curative effect.

The minimum dose per application he thought should be from 5 to 6 H; the total dose absorbed should never be less than 30 H.

In instances he had caused the absorption of 8 to 10 H during a treatment.

Whether 5 or 6 H or 10 H has been absorbed, it is imperative to wait until all trace of reaction has disappeared before making another application.

Radio-therapy is not infallible and like all other treatments it may fail.

He does not believe that it has been demonstrated that radio-therapy has caused a generalization of the disease. It is often unable to prevent it, but it cannot produce it. Such generalization, he thinks, would have taken place under any other method of treatment, or if no treatment had been employed. There is abundant clinical experience to prove these facts.

In brief, radio-therapy constitutes the method of choice for the treatment of cutaneous epitheliomas.

From the standpoint of the preservation of movement, and the cosmetic results, it is superior to all other methods of treatment.

Admitting that it does not insure against recurrences, it is in that respect on an equal footing with the other methods, and he thinks it illogical to deprive patients of the benefit of a method of treatment under the pretext that it occasionally fails to cure.

BOOK REVIEWS.

THE INFLUENCE OF THE MENSTRUAL FUNCTION ON CERTAIN DISEASES OF THE SKIN. By DUNCAN BULKLEY, A. M., M. D., Physician to the New York Skin and Cancer Hospital, Consulting Physician to the New York Hospital; Consulting Dermatologist to the Randall's Island Hospitals, to the Manhattan Eye and Ear Hospital, and to the Hospital for Ruptured and Crippled, etc. New York: Rebman Company, 1123 Broadway; London: Rebman Limited, 129 Shaftesbury Avenue. Price, cloth, \$1.00 net.

In this little volume the writer has filled a place in the field of dermatology that will be highly appreciated. The relation of the influence of the menstrual function upon skin diseases has been long appreciated. The large clinical experience of the writer has enabled him to give critical consideration to the subject. The volume is neatly bound and printed on good paper.

MODERN MATERIA MEDICA AND THERAPEUTICS. By A. A. STEVENS, A. M., M. D., Lecturer on Physical Diagnosis in the University of Pennsylvania; Physician to the Episcopal Hospital and the St. Agnes's Hospital; Fellow of the College of Physicians and Surgeons of Philadelphia, etc. Fourth Edition, thoroughly revised in conformity with the eighth revision (1905) of the United States Pharmacopœia. Published by W. B. Saunders & Co. Cloth. Price \$5.00 net.

This, the fourth edition, has been revised to conform with the last edition of the United States Pharmacopœia.

New articles have been written dealing with Scopolamin, Ethylchlorid, Theocin, Veronal, and Radium. In the section on Radiotherapy much new matter has been incorporated. The first portion of the work deals, as most works on the subject do, with the compositions and preparations of drugs and methods of administration, followed by a complete list of classified remedies. Thirty-two pages only of the work are devoted to the use of remedies other than drugs. It is probable that the works of this kind that are being issued in conformity with this Pharmacopœia will either omit absolutely to deal with remedies other than drugs in the future or devote a fair amount of space to their consideration. As treated in this work, electricity has been considered as of practically no

therapeutic value, and from a primitive point of view. The latter portion of the work contains practical consideration of applied therapeutics covering a wide range of conditions.

An index of 30 pages completes the work.

From the medicinal point of view the work is a valuable addition to literature. It is written in a clear, concise style, printed on good paper, and bound in the substantial and attractive manner characteristic of these well-known publishers.

HANDBOOK OF ELECTRICITY IN MEDICINE. By Dr. W. H. GUILLEMINOT (Paris). Translated by W. DEANE BUTCHER, M. R. C. S., Surgeon to the London Skin Hospital. With Eight Plates in Colors and Seventy-nine Illustrations. Published by the Rebman Co., New York and London. Price \$4.00.

The writer appreciates the necessity of the recognition of electricity as a therapeutic agent of first importance. He says, "If the progress of science finally enables us to master this force, which is the very essence of life, and to subjugate it as steam has been subjugated to the service of mankind, we shall have ready to our hand the most potent agent ever imagined, to modify the evolution and ameliorate the condition of living beings."

In Part I. of the work he considers the physics and use of all currents employed in therapeutics from the technical point of view, as well as the employment of the Roentgen ray. Ozonization, Electricity as a Generator of Motion, Vibratory Massage, Passive Gymnastics, Photo-therapy and Thermo-therapy, Magnets and Electro-Magnets.

Part II. is devoted to the consideration of the Physiological Actions of the Various Electrical Currents as well as the Physiological Action of Various Radiations, Ozonization, and Mechanical Applications.

The last part is devoted to medical treatment, including the Neuro-Muscular and Neuro-Sensitive Systems, the Vascular and Infective Systems, Bones and Gynecology and Andrology, Affections of the Kidney, Urinary and Skin Diseases, Defects of Nutrition, and Affections of the Mouth, Throat, Larynx, Ear, Respiratory Passages and Eyes, Malignant Tumors and Foreign Bodies.

The reader will find in the volume a very large fund of information on the subjects treated, but in few instances exhaustive considerations, as would be impossible in one volume of 560 pages. The subjects are treated in a thoroughly technical and scientific manner and will be found a valuable addition to the library of the student of physico-therapy.

The work is written distinctly from the French point of view, the therapeutic features of the work partaking very largely of the empirical. The book is well arranged and bound in the publishers' characteristic good style.

NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

A NEW CONDENSER FOR STATIC MACHINES.

BY FREDERICK HOOKER, M. D., SYRACUSE, N. Y.

In October, 1905, I began a series of experiments, having in view the increase and intensification of the so-called high-frequency output of the static machine, previous experiments with the Leyden jars and solenoid having proven unsatisfactory.

The result of these experiments was the adoption of a simple and inexpensive condenser, by means of which the output of the machine was increased fourfold; and I have used this condenser daily for over six months with the best of satisfaction, both in ordinary and tubercular work.

It can be made by anyone in a short time at an insignificant cost.

My condenser is made of a heavy plate glass, with rounded corners and edges.

One side is insulated with shellac, and in the middle of this side of the plate an elliptical piece of sheet lead (3 x 5 inches) is cemented.

A loop, composed of many fine copper wires, which are spread out as much as possible beneath the lead sheet, and with it securely cemented to the glass, protrudes through a small hole in the center of the lead sheet and holds a small ring in place.

The mode of application is simple.

A cord or chain, having a small snap attached to one end, is connected to the ring on the back of the plate; and to one pole of the machine, the same pole being also grounded.

The free side of the plate is connected to the patient; either by having him lay his hand upon it, or by laying it upon some surface, as of the abdomen, care being taken to keep the cord or chain out of sparking distance with the patient.

The vacuum electrode is connected to the opposite side of the machine and the machine started.

The spark-gap is opened to limit of tolerance, which may vary from a small fraction of an inch to two inches, though so large a spark-gap, judging from my own experience, will rarely be tolerated.

This condenser simply makes the patient the outer coating of a Leyden jar.

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PHOTOTHERAPY IN GENERAL PRACTICE.*

BY HERBERT PITCHER, M. D., HAVERHILL, MASS.

When Dr. Oliver Wendell Holmes made the classical remark, "If all the drugs were cast into the sea, it would be well for man and bad for the fishes," he little realized that his fling at drugs would become a fact and that a large portion of his professional brethren would become drug nihilists.

I believe "Osler's Practice of Medicine" is considered by good judges of medical lore to be the best work on that subject in the English language. His definition of disease, pathology, etiology, histology, diagnosis, and prognosis are all quite voluminous, but when he comes to treatment it is dismissed in a dozen lines or less. What does this indicate? Are the best teachers losing confidence in drugs?

Drug medication in itself has always been more or less uncertain. An old practitioner once said, "There are only two drugs of which I am sure, one is opium and the other castor oil."

We pride ourselves upon the position the family physician occupies in the world, but it is humiliating after we have burned the midnight oil as students, toiled night and day as practitioners, run at the beck and call of the rich and poor, the good and bad, laid awake nights thinking and worrying over the ills of our patients, and perhaps be greeted the next morning with the salutation, "We have concluded to try Christian science."

I know people are prone to run after "false gods," but it seems to me they continue to run, and like sheep jumping over the wall they have many followers.

We pooch at Christian science, osteopathy, and other cults, but when quite a large per cent. of our patients take up with that kind of foolishness we begin to wonder why.

* Read before the New England Electro-Therapeutic Society.

The same conditions may have existed in times past; but not in our time. I believe matters religious are passing through something of the same kind of evolution and our reverend brethren complain of their parishioners thinking for themselves, and they do think to some purpose.

Our patients are beginning to think, and many of them are tired and sick of being drugged, and they are calling for a more rational treatment. Undoubtedly drugs will always be used in acute diseases, but in the so-called chronic diseases, I think other and better remedies can be used. Some great man has said: "To electrical forces and animal serums and extracts must we look in the future in all probability for the remedies to combat many diseases now called incurable." Looking back ten years we can note many new and wonderful discoveries. Some of them have overturned law which seemed as fixed as the hills. Could we but look into the future a few years, our eyes would be dazzled by the brilliant achievements. Although we live in an age of progress, our knowledge is quite limited as to the real cause of many diseases.

It is only a few years since Koch made his name immortal by discovering the tubercle bacillus. Well has tuberculosis been called the "great white peril," for it has killed more people than all the wars. For ages the profession has tried to discover a remedy to successfully combat it, but until within a few years have all theories, experiments, and sinecures, one after another, been tried and found wanting. But at last a real remedy, a real sure cure has been discovered. From the most fatal malady known it is now looked upon as quite amenable to treatment. Some authorities claim a cure of 75 per cent. if the disease is recognized and treated in its early stage. What is this wonderful treatment? Have drugs accomplished all this? Alas, no! This priceless remedy has always been with us, free and without price, and it was reserved for the present generation to apply it; all we have done and are doing is to open the doors and windows and let in good pure air and the glorious sunshine. Sunlight is undoubtedly the best and most universal remedy. The ancients worshiped the sun as the most glorious object in nature, and as the source of light and heat, idolized it as the Godhead of life itself.

"Sunlight is the most intense radiance at present known. It far exceeds the brightness of any artificial light yet invented.

The calcium light and the most powerful electric arc interposed between the eyes and the sun's surface appear as a black spot upon the disk. The candlepower of the sun is said to be about fifteen hundred and seventy-five billions of billions."

I will not go into the physics of radiant heat and light as its origin and transmission is pretty well understood.

Larkin says: "Man lives only by the radiance from the photosphere of the sun. By this great energy everything within its radius is purified, every object it penetrates is disinfected, and every known form of germ life is either destroyed or its development arrested.

"To this source can be traced directly nearly all the energy involved in all the phenomena, chemical, mechanical, or vital.

"In this solar energy is to be found the simplest and most natural method of using light therapeutically."

The inhibitory power of sunlight upon the growth of tubercle bacilli was established some years ago and is too well known to admit of discussion. Its action upon tuberculosis of the lungs, joints, bones, and glands, as well as upon bronchitis, asthma, and many other diseases is recognized and utilized as much as possible.

In the crowded cities where the greatest need exists for radiant energy is just the place we cannot obtain it. Here we find a good substitute in the electric light.

The utility of light and heat as a therapeutic agent is now so generally recognized by the medical profession all over the world that the better equipped hospitals and infirmaries are now provided with apparatus for administering this treatment.

There are several different methods used in producing radiant light. For giving body treatments the arc-light bath and the incandescent-light cabinet are used. Dr. Cleaves of New York has used the arc-light bath for nearly twelve years, with great benefit, in all forms of tuberculosis, many skin diseases, nervous affections, diabetes, albuminuria, and other diseases. Strebel has used it in a number of cases of diabetes with great improvement in general health, and complete disappearance of sugar.

Crothers of Hartford has made many practical experiments with the radiant-light bath in many conditions dependent upon toxemias. His conclusions are that: "It penetrates to the deeper tissues of the body and is turned into heat and so trans-

formed into nerve energy more positively than administrations of dry hot air.

"The clinical effects of the radiant-light bath prove its power as an eliminating agent, and as a corrector of neurotic, nutrient, and capillary disturbances. Its physiological action depends upon the heat and chemical rays coming in contact with substances that are resistant to their passage and thus transforming them into heat and light energy."

"The skin is a poor conductor of heat, but readily transmits light and radiant energy. Thus in the deeper tissues it becomes changed into heat.

"Radiant energy has two marked actions on the skin and tissues—one of stimulation and the other sedation.

"The stimulating action falls first on the sensory, then on the vasomotor and heat centers, and lastly, on the secreting centers. The vasomotor centers, controlling the constriction and dilatation of the walls of the arteries, respond very quickly to surface changes.

"Light has a special action on the vaso-dilators of the arteries, stimulating increased activity and permitting the blood to flow more rapidly to the surface. This takes off the burden of the heart's action, and relieves the constrictions to the arterial circulation and to the capillaries. Oxidation is increased with an increase of elimination. There is a fall in arterial tension and a uniformity in the action of the heart and respiration."

The effects of this method of treatment on arterio-sclerosis are rational and beneficial. In albuminuria Dr. Lebon has had many cases which were improved. Good results follow this treatment in rheumatoid arthritis, also in gout, rheumatism, asthma, and neuralgic conditions. In the local application of light I have used with great satisfaction the high candlepower incandescent lamp (five hundred candlepower), using twelve amperes of current.

This lamp seems to possess the actinic or chemical rays and the heat rays,—radiant heat,—which are powerfully stimulating and penetrating. These lamps produce dilatation of superficial blood vessels, relieving congestion of internal organs, affording an analgesic action which is most gratifying.

"When we stop to consider that the skin is capable of holding, when these vessels are fully distended, one-half or two-

thirds of all the blood in the body, we can readily see the immense benefit we can obtain from this form of treatment."

Dr. Kellogg, in his article in Cohen's *System of Physiologic Therapeutics*, shows the relation of the blood supply of internal organs to the skin. He shows how freely the vessels of the brain are connected with those of the scalp and nose, how the circulation of the middle ear is connected with the skin of the face and head of the same side through the common carotid artery. "The circulation of the internal ear, on the other hand, is associated with the skin of the back of the neck, being derived from the vertebral arteries. The vessels of the mucous membrane of the nose and pharynx are associated with those of the face and sides of the head through the common carotid. The circulation of the lungs is collaterally related with that of the skin covering the arms, the chest, and the upper part of the back. The pericardium and parietal pleura of the anterior portion of the chest are connected with the skin covering the anterior portion of the chest wall through the internal artery, while the pleura of the posterior portion of the chest is related to the intercostal vessels. A collateral relation also exists between the bronchial arteries, the nutrient arteries of the lungs, and the intercostals. The skin covering the arms is related with the pleura and anterior portions of the chest through the subclavian artery, the nutrient vessels of the lungs and the vessels covering the anterior portion of the neck through the branches of the internal iliac artery."

There are still other connections which show the extensive communications between the pulmonary circulation and that of the cutaneous surface, all of which are of high therapeutic interest. The kidneys are associated with the skin covering the loins through the renal branches of the lumbar arteries. The vessels of the prostate in man, the uterus and ovaries in women, the bladder in both sexes, are associated with the cutaneous vessels overlying the sacrum, the buttocks, the perineum, external genitals, the groins, the inner surface of the thighs, and the suprapubic region; these parts being chiefly supplied by branches of the internal iliac artery.

Space forbids extending this interesting subject. We all know the important relationship, both venous and arterial, between the stomach, liver, spleen, intestines, and even the pan-

creas, and the skin of the trunk which overlies those deeply seated organs.

How well every mother recognizes the benefit following the application of a mustard paste to the stomach when the children have a pain therein, or a hot flaxseed-meal poultice, or other hot fomentations to the chest when they have bronchitis. They know it relieves and does good by bringing the blood to the surface.

How much more beneficial must be a method of treatment whereby the vessels are more fully dilated than is possible by any other method except that of radiant heat which penetrates beyond the surface. It is not the heat alone which is so beneficial, it is the light rays which penetrate the tissues and stimulate the vaso-dilator nerves and relieve congested internal organs.

Although the technique of this high candlepower lamp is simple, there is danger in giving treatments too long and too frequent. We must remember it is a potent remedy and evil results might follow too enthusiastic applications. Like other modalities new to the world, we should carefully study our cases and watch the effect of the treatments, being careful not to bring a valuable remedy into disrepute.

A few cases treated within the past year will illustrate its beneficial action:

A boy, nine years of age, whose ancestry on both sides was tubercular, was always a very delicate child. He had had two attacks of pneumonia and frequent attacks of bronchitis. A year ago last January he was operated upon for tubercular peritonitis and several enlarged mesenteric glands were removed. He did not react well from the operation and although he lived outdoors all the summer and autumn and received the best possible care, he remained weak and delicate. I saw him in October when he returned from the country. He had an evening temperature of one to two degrees above normal and very little appetite. He was easily fatigued, had some enterocolitis, and complained of his left thigh paining him. There was some lameness in his left leg—especially at night, after a little extra exercise. I ordered rest, most nutritious diet, and continued life in the sun and outdoor air when possible. As he did not improve after about six weeks, I sent him to Boston to consult an orthopedic surgeon. He said there was undoubtedly a tubercular focus in the hip-joint, and thought we had better continue present treatment a while longer.

December 15th I gave him a light treatment, and from that time he has taken two treatments per week. After six treatments there was no pain or lameness. His general health im-

proved rapidly, appetite became good, and bowels normal. At the present time I do not know of a more rugged-looking boy, he runs and plays all day and says "he never gets tired, and never felt so well in his life."

After the first two or three treatments the rays were applied as strongly as he could possibly bear, up and down the spine, to the abdomen and chest, to the left hip-joint and thigh. I continue the treatment only because his people wish to keep him well through the changeable spring weather. He has not coughed nor had a cold this winter, which breaks the record for him.

A case of sciatic neuritis which had resisted other forms of treatment was cured by the light. This was a very severe case which had existed about six months. The patient, a lady fifty years of age, was very much worn and debilitated by the constant pain which had kept her from taking proper nourishment and sleep. The light was applied to the spine which increased the general metabolism and stimulated the nerve roots.

Then the light was applied with all the heat the patient could possibly bear up and down the course of the sciatic nerve, and especially over the sciatic notch.

A case of mastoiditis was cured in five treatments. This case, a woman, thirty-six years of age, had been treated a week by the usual remedies before I saw her. She complained of very severe pain in and around the ear and mastoid, with tenderness on pressure and pain on percussion over the mastoid bone. The membrana tympani was red and inflamed, and temperature 100.2°, without chill.

Application of strong light was made over the mastoid, in and around ear, side of the face, head, and neck of affected side for fifteen minutes. She returned next day with report of a good night's rest, but some pain yet. Another application, the same as before, was made. The patient said there was absolutely no pain when she left the office, and there was no pain whatever after that. She received three more applications with complete subsidence of the inflammation, and there has been no trouble since.

A man, sixty-three years of age, weighing 240 pounds, had the grippe, followed with severe pain in right side of his head and ear for three weeks. The last week the pain was so severe he could neither eat nor sleep. When I saw him he was a wreck. There was a profuse purulent discharge from the ear, the membrana tympani was ruptured, and the typical conditions with the symptoms of acute purulent otitis media. After thorough cleansing of the canal I applied the light for fifteen minutes to the painful side of the head and neck, and into the orifice of the external meatus.

The patient returned next day saying that, "he had had the first good night's rest for three weeks." He received six treat-

ments with the result that pain and inflammation have entirely subsided, discharge ceased, and the patient was feeling as well as usual. There has been no return of ear trouble.

I could enumerate many cases of like conditions and results. It is a source of great satisfaction to me to be able to relieve and even cure poor suffering humanity of a disease at once so painful and possibly dangerous to the loss of hearing and even life itself.

I do not contend that it will cure all cases of severe inflammation of the middle ear or where the mastoid has become affected, needing operative relief. But if the light could be used in the early stages it would abort the inflammatory conditions in most cases.

I have also used this light in several cases of inflammation of the accessory sinuses with equal success. When we hear patients who have suffered for days and nights from that terrible pain which is the result of inflammatory conditions confined in those narrow, bony cavities like the ear and accessory sinuses, exclaim: "Oh, how good, how blessed!" we cannot help reminding ourselves of the old remedies we have used without even obtaining relief, until we found refuge in the use of morphia with its baleful after-results. I would like to relate many other cases benefited by light treatment, but time forbids.

I do not claim light as a panacea, neither should any one method be used exclusively. We should study each case individually, and treat it accordingly. Because a patient has a cancer, or a synovitis of the knee-joint, does it necessarily prohibit him from accumulating other disorders? We would consider a man demented if he now bled all his patients as did the physicians in the dark medical ages.

We are supposed to be broad-minded practitioners. If we think after a careful examination of our patient and in accordance with our best knowledge and judgment he needs a dose of salts, salts he should get. But if we think a light treatment will best eliminate the toxins and their action upon the nerve centers, that by dilating the peripheral circulation we relieve the congestion of internal organs and thereby help metabolism, that is the treatment we should employ.

If we can cure a case of acute brachial or sciatic neuritis by the application of the peculiar current or modality of electricity indicated, quicker and with better results than by the use of drugs, that is the method to use. If we are to advance with the rest of the scientific world we should put away prejudice and jealousy, open our minds to all knowledge, cling fast to that which is good and reject the bad as useless. It would be foolish to set any limits to the bounds of human power, for we live in eternal expectation of a complete and final answer to the most momentous questions of all time.

THE MECHANICAL TREATMENT OF CONSTIPATION.

BY FRED H. MORSE, M. D., BOSTON, MASS.

Constipation occurs under so many conditions that the successful treatment can be brought about only by just appreciation of the etiology of individual cases. Therefore, I will conform myself to certain conditions in which drugs are worse than useless, and where the proper dietary arrangement avails but little. It is an established fact that among the chief causes of constipation, are those of central nervous origin; including both cerebral and spinal.

Spasmodic conditions in the periphery of the splanchnics, pneumogastric, cervical, or dorsal sympathetic, are sufficient causes to account for constipation. Lack of nerve force, either motor or sensory, whether due to impairment or destructions of histological elements and hysteria, implying a diminished nerve control, can readily explain another cause. Weakness of the muscles of the intestinal and abdominal walls is also a very common factor in the causation of constipation, and becomes a strong therapeutical indication for the modalities, of which I shall speak. With due respect to the dietary and medicinal aspect of our subject, I think that we have in electricity, in its various forms, mechanical vibration and mechanical massage, methods whereby we can accomplish the desired result with a greater degree of certainty, and with more enduring effects than by other procedures understood at present.

It is known that muscles possess an independent power of excitability which may induce more energetic contractions as the result of external stimulation. This may be induced by mechanical stimulation, heat and cold, electricity, or chemical agents. Certain parts, when stimulated, excite muscular contractions; other parts tend to arrest or inhibit movement, and their combined action, when normal, results in a healthy physiological activity. Muscular spasms, then, may result as readily from defective inhibitory action, as from an excessive excitability of motor nerve centers, and in the treatment of various spasmodic symptoms for internal medication, this principle is recognized.

To lessen the irritability of the motor centers the bromides are given; to stimulate the inhibitory centers alcohol is administered. It is on this principle, we believe, that combined electrization acts.

The action of electricity for the relief of constipation is two-fold: (1) the effect that may be produced by improving the nutrition along the course of the nerves controlling certain parts of the viscera, and (2) its action as a direct stimulus; or in other words, the effect may be produced such as we would desire and expect electricity to have on partially paralyzed muscles in other parts of the body.

By understanding and appreciating the value of the continuous current in its influence upon the circulation, the intelligent use of it in many of the neurotic cases will indirectly cure constipation by its action. The quantity and direction of current varies in the different procedures as in all electrical treatments according to the indications.

Of each subject the technique in every individual case must be carried out with just appreciation of the cause or causes behind it; therefore it is possible, only in a general way, to give the particulars of treatment. But briefly speaking, in neurasthenic cases, where the downward continuous current through the pneumogastric, with a current from two to five ma. employing the interruption in the continuous current (galvanic) from spine to abdomen, using large electrodes, almost always placing the positive one on the back.

The sinusoidal current, and the induced current of high tension, produces a much deeper effect than the usual form of faradic apparatus, or that of low tension.

The slowly interrupted current, as is generally used from the primary coil, produces very little effect as far as electricity is concerned, but can be made useful by virtue of its mechanical action in cases of thin abdominal walls, or where the more powerful mechanical vibration and massage might for various reasons be contraindicated.

The interrupted continuous current with the interrupter adjusted in its undulations to meet the indications of the case in hand, is probably the most potent form of electricity to use in chronic constipation. This may be used with a large abdominal electrode, and the other on the proper part of the spine, or within the rectum, as the individual case demands, taking due

care that the seance is not too severe or prolonged to cause unpleasant reaction.

Massage, properly applied, is of great value in treating constipation. In my own work, I prefer the use of a tissue oscillator, having one that can be adjusted to heavy or light, superficial or deep, rapid or slow manipulations to almost any part of the body. It is run by a 1-2 hp. motor and consists of a powerful iron frame, to which the patient can be so harnessed as to produce a great variety of motions. This arrangement has proved very efficacious in the treatment of chronic constipation, which was unaccompanied by any conditions of an inflammatory nature, independent of any electrical application. This has been especially observed while treating cases of obesity, where the constipation was only of secondary consideration, and I recall instances where the usual daily cathartic, which had been taken by the patient for years, had been dispensed with.

Vibratory treatment of constipation consists in the manipulation of certain spinal nerve centers, which in many cases can be made very effectual, but rigid attention to the details of this particular modality is all-important, as the usual haphazard indifferent use of many of the vibrators is not only valueless, but may prove harmful. Some of the contraindications for massage and the interrupted continuous current, would be the presence of cancer, ulcer, or any acute inflammatory condition.

The application should be made between the transverse processes of the spine, and I think it is usually considered by experts on this subject that the opposite sides treated alternately produce a better effect than if one side were treated completely, then the other.

Physiology teaches us that from the sixth to the twelfth dorsal, stimulation controls the inhibitory action of the small intestine, and of the second, third, fourth, and fifth lumbar and the first, second, and third sacral, induces inhibition of the large intestine, also second, third, fourth, and fifth lumbar, inhibit for descending colon and rectum. The inhibitory nerve of the small intestine is the splanchnic, while the capillaries contain arterial blood; when this changes to venous the splanchnics are stimulated and persistalsis is increased.

In vibrating the abdomen it is essential that the bladder be emptied, the abdominal muscles relaxed by having the patient on his back with knees flexed, and the pressure to be exerted

should never be allowed to cause pain. Gradually increasing the rapidity of the stroke, or length of vibrations will usually establish an easy tolerance to the application, compared with giving the full force at once.

The frequency of the séances should be, generally speaking, every day, or every other day for a while; and gradually increasing the time between treatments, as the results are obtained. In each case, if one has at his command the different kinds of apparatus, which I have mentioned, he will probably find indications for the use of both electrical and mechanical means on the same case, either in conjunction or alternately.

There are three reasons, broadly speaking, why so many are disappointed in the results obtained from the use of physical methods of treatment, and especially electricity, in those cases, where according to well established principles, the treatment ought to be efficacious; (1) ignorance of the physics and physiology of the methods employed; (2) imperfect technique; (3) failure to appreciate the differential indications for the use of the various modalities.

One may possess a thorough knowledge of physics, but if his technique is faulty, this knowledge will avail nothing.

6 Tremont St.



THE STATIC SPARK AND ITS THERAPEUTIC INDICATIONS.*

BY WILLIAM BENHAM SNOW, M. D., NEW YORK.

The spark is the oldest of the static modalities. The first record of its employment was by the Abbé Nollet in the year 1734 for the treatment of various diseases. In later years Benjamin Franklin, the American philosopher, and student of electricity, who did so much towards the discovery of the characteristic actions of electricity and demonstrated its relation to the lightning phenomena, greatly perfected the apparatus for producing the static discharges.

The machines used by these early observers were always of the friction type, either employing amber, glass, or hard rubber for the production of the electrical discharge. In fact the word electron was from the Greek word indicating amber. It was observed that by the friction of various materials upon a smooth surface of amber, electrical sparks could be produced and also that a surface thus excited would hold for a time an electro-static charge.

Franklin's machines in connection with the Leyden jar enabled him to administer sparks of good length by charging and discharging the condensers. This crude and slow method of producing sparks rendered the art as applied to therapeutics a rather laborious and unsatisfactory one, and probably, together with want of recognition of the *modus operandi*, prevented its early adoption by the profession. Franklin, the scientific layman, however, is reported to have performed many cures by this method. Just what were the characters of the cases treated, history does not relate. It is also told that John Wesley, the founder of Methodism, during his sojourn in this country made use of Franklinism, sparks, performing many cures.

It was not, however, until a comparatively recent period when through the interest taken in static electricity by Charcot and Vigoureaux, who following up the discovery of Holtz, were able to employ a current excited by induction, of greater energy and more efficient for therapeutic purposes, that the employment of the static machine in therapeutics became a recognized fac-

* Read at the Fifteenth Annual Meeting of the American Electro-Therapeutic Association, at New York, September 21, 1905.

tor. Charcot and Vigoureaux, not recognizing their effects upon congestion, made use of these means more largely for the suggestive effects in connection with the treatment of nervous diseases, and from this use by these authorities the heritage has come down to the profession that the static machine is at best only a good measure for employing suggestion in therapeutics. Many authorities, who should know better, still so consider it.

It is undoubtedly due to the energy of our confrère and honored associate, Professor William J. Morton, and his co-workers, that the greater perfection of the Holtz machine, as well as the recognized therapeutic value of the static modalities, were brought about. These improved machines have placed the profession in possession of a means of producing static sparks of greater energy than previously.

The old Holtz machine, which had its place in the offices of many of our eminent neurologists fifteen years ago, like Franklin's machines, was incapable of producing the necessary extent of therapeutic results in many cases. At this time, the static induced current, static insulation, the static breeze and spray, and static spark were in vogue, and with machines of this early type the therapeutic effect upon a full-grown adult was inadequate for the induction of the necessary energy for general therapeutic effect. It was not until the perfected Holtz machine, having at least eight revolving plates, thirty inches in diameter, appeared, that the possibilities of success in most cases to which these modalities are adapted, was possible.

The older men in the profession, who formed their prejudiced opinions concerning the efficiency of static electricity from the early ineffective type of apparatus and without the correct conception of its action, are the men, who, with their influence, stand in the way of progress in the therapeutic application of static electricity to-day. It is they who now, in ignorance of its value, discountenance its use; they who, like Charcot, have only deemed it as a means of employing therapeutic suggestion.

Many now look upon the employment of the static spark from an incorrect point of view as to the effects produced, and discountenance its use because the application is painful, relying too often upon feeble, less painful modalities and thereby fail to obtain some of the grand results for which we must look to the static spark.

The development of a more precise technique and a correct understanding of the *modus operandi* or physiological action of the static spark has given this modality a place in therapeutics which cannot be filled by any of the less painful modalities. It is particularly adapted to cases in which a deep, penetrating effect is required, in order to remove deep-seated local infiltration, congestion and stasis. It is to the static spark therefore that we look for the most satisfactory results in the treatment of joint affections and congestions, located in the larger or deeper placed muscular structures and joints of the body.

A correct recognition of the particular action of the static spark is necessary to an appreciation of the effects produced. When we speak of the static spark we, as a rule, refer to the indirect spark, as derived from the connection of the patient with either pole of the Holtz machine, the other pole being grounded, and the application made from a metal ball in connection with the earth by another direct metallic connection. The operator is then able to apply the spark without any appreciable effect upon himself and the maximum effect is produced by the spark. The degree of intensity measured by the length of spark may be regulated by controlling the speed of the machine, other things being equal. A method of regulating the length of spark that is to be applied without altering the speed may be easily managed by means of a resistance controller, either moved to and fro from the margin of the platform, or from the side of the machine not grounded, by which the voltage capacity of the current is raised or lowered. The writer's practice, however, is to move either his foot or limb to or from the platform according to the length of spark he wishes to administer, thereby doing away with the superfluity of devices suggested.

The length of spark that is indicated will depend upon the depth at which the condition under treatment is to be affected. In other words, when applying a spark to the smaller joints, as of the fingers and wrist, sparks from one-half to one inch in length are adequate, while for application to the knee and hip joints of adults they should be from four to six inches long in order to effect the desired result. Likewise, when applying sparks over the spine, for the treatment of lesions of the cord,

a long, indirect spark, from six to eight inches in length, will be necessary.

A description of the character of action of this modality will better explain the reasons for its administration. It must be recognized, that when a spark is discharging from a patient it represents practically a discharge as of one of the surfaces of a Leyden jar which is charged. In other words, the surface of the patient is surrounded with an electro-static field, and the metal ball electrode connected by a metal conductor with the earth is brought to a proximity at which a spark will escape. At this juncture, the phenomena are associated with three features: (1) The escape of the electrical charge from the surface of the body practically through the tissues of the patient to the point of exit converging from all sides by the shortest route to the point of discharge. (2) The instant that the discharge takes place, the convergence and escape of the electrical stream throws the tissues at, and immediately surrounding the point of discharge, into a condition of violent contraction, the depth and extent of the contraction being always relative to the length and intensity of the spark discharge. (3) The phenomenon of the discharge (spark) is visible, as it takes place through the dielectric between the patient and the discharging electrodes.

The first feature is associated with a unipolar action upon all or most of the cells in the path between the surface and point of escape. A majority of the cellular structures of the body are thus thrown into a degree of agitation relative to the possibility of their acting in the mass of the tissues as single entities, influenced as they are certain to be by polarization as are bodies like charged when they seek to separate from each other. We have a right to assume that the cells under these conditions are variously agitated by the passage of these electrical streams or currents. Ionization, under this circumstance, cannot take place except to a very slight degree, because the passages in and out under Leyden jar conditions, are practically of one polarity, the other polarity occupying the field shut off by the glass or vulcanite legs of an insulated platform. Under the condition of administration, the field of greatest stress is at the surface opposite or nearest to the ball electrode in the hands of the operator,—the point of greatest stress of another condenser.

The second feature, that associated with a degree of muscular and tissue contraction, is mechanical in character. It is this mechanical action by which the tissues when a region of stasis or congestion is present, instantly expels the fluid contents of the tissues, by an energetic action forcing them in the direction of the various outlets, vascular and lymphatic. It is this effect which occasions the relief of pain which follows, by removing from the irritated axis cylinders or neurons the pressure of the exudation. The tissues that are thus thrown into contraction will afterwards preserve a tonic condition, as is demonstrated from the fact that pain does not recur for hours in most cases, and if persisted in with a regulated frequency is followed by the ultimate cure of the local condition. The mechanical actions thus induced not only effect the drainage of the overloaded tissues, but at the same time gradually restore the normal activities of local metabolism, influencing a greater activity of the enzymes in their function of local tissue repair, promptly terminating in the restoration of normal conditions.

The third feature, the spark discharge, to which we will refer only as a physical phenomenon, is now, in the light of the later recognition of electricity as actual substance, a change of condition of the positive and negative electrons in the dielectric. The energy expended in the mingling of the positive and negative electrons results in the decomposition of the atmosphere with the addition at least of oxygen and hydrogen with the production of immediate chemical constituents. For under the laws of conservation of energy nothing is lost. The resulting products of the chemical decomposition and additions of electrical substance are ozone and nitrous acid, water and other possible chemical combinations, together with heat and light. The fact that the spark discharge is taking place represents the completion of the circuit with the ultimate dissolution of electrical energy, or as such the change of substantial electrical energy into other forms of energy is unquestionably demonstrated in the action of the spark within a sealed or airtight muffler placed upon the discharging rods of a static machine. It is found by all familiar with what takes place in the muffler that H_2 , O , NO , and O_2 accumulates besides the formation of metallic incrustation upon the metal parts of the muffler within.

The two types of static spark which are of particular therapeutic value are the indirect spark previously described and the resonator spark derived from a Tesla coil or solenoid or a combination of a Tesla coil with a solenoid and condensers—usually Leyden jars. The static induced current, when passed through a Tesla coil, is transformed into a current giving discharges in impulses of larger amperage than the continuous current from the static machine. These sparks may be administered either from a metal ball or a glass vacuum tube and the intensity varied by the length of the spark-gap between the balls of the discharging rods of the Leyden jars, or by the combination of a solenoid with the Tesla, or by grounding one side of the Tesla coil. The sparks thus produced are shorter in length than the indirect spark, and produce a stinging sensation somewhat different from that of the indirect spark.

The special indications for this form of modality are in skin diseases and to painful surfaces requiring a less deep or penetrating effect than that derived from the indirect spark; for example, the application to the finger joints in the treatment of rheumatoid arthritis.

The application of sparks may be effected in the following manner in such a way as to localize the spark with precision to the exact point at which the administration is indicated by means of a localizing electrode (see Fig. 1) having a long vulcanite or glass handle with various terminals. The metal portion is placed in contact with the part to be treated and the spark applied directly to a small metal ball or disc designed for the application of the spark. In this manner a spark may be administered with varying intensity, which may be regulated by the extent of surface contact of the terminal employed



Fig. 1.

and the length of spark to be applied. By this method the local administration may be made in clefts, hollows, or even within the cavities of the body with precision. In this way the painful feature of the spark may be to some extent eliminated and the local effect dispersed according to the indications by applying the various terminals to the surface treated.

The therapeutic indications for the employment of sparks cover a very wide range of conditions, for they include most of the inflammatory affections, excepting those associated with a septic or other germ process. Often, however, less painful modalities will effect the same result and should then be employed. The nature of the effect produced is indicated above, the induction of an intense, instant, muscular and tissue contraction at the vortex of the discharge and extending to a depth and extent in the tissues relative to their density and the intensity or *potential of delivery* of the discharge—the length of spark always determining the depth and extent of the contractions induced. Upon the principles, as I have considered them in my previous works, this contraction not only induces tissue drainage or an expression of the fluids bound up in an area of local stasis, but at the same time induces local activity in the tissues, probably largely through its influence upon the end organs. Experience has demonstrated that in the treatment of inflammation of various types affecting the large joints, no modality is so effective in eliminating the products of inflammation and restoring a normal condition as the static spark. If for no other purpose than this, this modality was employed, its place would be invaluable in the field of orthopedic surgery. The writer's successes in the treatment of rheumatoid arthritis, synovitis, and the conditions associated with trauma in the various joints, has been more largely due to the judicious application of static sparks than to any other means employed.

349 W. 57th Street.



PHYSICO-THERAPY AND PHYSIO-THERAPY.*

BY DOCTEUR J. A. RIVIERE, PARIS.

Are the two terms physico-therapy and physio-therapy synonymous, or do they indicate two different orders of thought?

We prefer the word physico-therapy, since we have coined it, popularized it, and given to it a definite meaning and place in medical nomenclature. Physico-therapy is a curative method based upon the combined employment of physical agents: whether these agents are made use of as they are found in nature (air, water, light), or in medical establishments equipped with apparatuses which have been conceived and grouped for their production and successful and energetic application.

Physio-therapy is a term which is much broader—in fact, so broad as to become vague. It is the use of all natural agents. All curative agents are natural agents. Physico-therapy would therefore include the use of ipecac, senna, etc., as well as all physical and physiological treatments. What characterizes our method of physico-therapy is the proper combination which we make of our numerous apparatuses in the treatment of chronic diseases.

To do this we possess a complete armamentarium which permits us to make use of all the physical agents in their most complex and varied forms. In our rational therapeutics we consider the patient before the disease, and the constitutional state before the symptoms.

Technical terms serve at best only to indicate the most prominent symptoms. We believe that disease only becomes manifest when the human mechanism is out of order. Auto-intoxication is usually due to human toxins before becoming due to microbic toxins.

Besides these auto-intoxications we have those which are caused by the failure to assimilate the nutritive material absorbed in too great abundance. The two principal causes of the disturbances of the economy are the moral and physical, which act through the nervous system, and the intoxications of all kinds, alimentary and others.

Physico-therapy, through its numerous agents, while it stim-

* Read before the Fifteenth International Medical Congress, Lisbon, April 19-26. Translation by Amédée Granger, M. D., New Orleans, La.

ulates and tones up the nervous functions, purifies and cleanses the entire organism.

Our method consists in the free use of electricity, water, heat, light, and movements, to render oxidation more active, favor the exchanges and eliminations of all kinds, and increase the vital energies after having given a thorough stimulus to the neurons. Our method is prophylactic and curative. We have always maintained that the functional trouble precedes the lesion. The nerve cells, being the most resistant, are the last to become altered, also the last to become restored.

Expectant medicine, which, thanks to the anorexia and the liquid diet, allows the patient to get rid of his toxin in acute diseases, is insufficient in the chronics, who require powerful assistance to help them to tone up and restore their erring functions.

Physico-therapy is the best method, through its immense resources, obtained from a complete armamentarium of physical apparatuses, to stimulate and assist Nature's own cure, in many cases where psychiatry and pharmacology combined are impotent. In other words, the field of physico-therapy is much better limited than that of physio-therapy. Its actions well understood direct but never disturb the vital forces.. It excludes violence and seeks to establish an equilibrium principally through its harmonizing effects on nerve force and phenomenon and its tonic and accelerating action upon the general metabolic processes, both of which are always more or less altered in all morbid states. Physico-therapy improves the nutrition of the cellular elements of the body, restores nervous equilibrium, and combats dystrophic conditions, through the means of the natural forces.

- (1) Water (hydrotherapy, balneotherapy, vapor baths).
- (2) Motion (kinesitherapy, orthopedics, massage).
- (3) Electricity (its various modalities).
- (4) Light (phototherapy, radio- and actino- therapy).
- (5) Heat (thermotherapy).
- (6) Air (aero- and pneumo-therapy).

These six agents may be combined (hydro-electro-therapy, hydro-masso-therapy, hydro-thermo-therapy, for example), or associated (massage and electricity), for the greatest benefit of our patients. But we must not, in order to obtain all the positive curative results, be contented with the vague aspirations of physio-therapy.

Further, it is necessary to possess and have ready for use when indicated the large number of apparatuses and appliances which form the complete physico-therapeutic armamentarium.

In brief, our term physico-therapy is more definite, and better adapted to the scientific method which utilizes the physical agent in medicine than the almost homogeneous but too vague term, physio-therapy.

NEURASTHENIA AND ITS TREATMENT.

BY CHARLES N. DE BLOIS, M. D., TROIS-RIVIÈRES, CANADA,

Physician in Chief of the Institut Hydro-Électrothérapique, Trois-Rivières; Physician at St. Joseph Hospital, Trois-Rivières; Member of the American Electro-Therapeutic Association, Société Française d'Électrothérapie, Société Internationale de Médecine Physique; General Secretary of the Third Congress of the Association des Médecins de Langue Française de l'Amérique du Nord; Secretary for Canada, Third International Congress of Electrology and Radiology, Milan, Italy.

(Continued from page 405.)

Hygienic and Moral Treatment.

The importance of psychical treatment should be considerable in a disease in which the patient loses all confidence in his health, strength and capacity to consult his own interests, inasmuch as he is only able, as Dr. Brissaud says, "to brood over his misfortune."

The first duty of the physician should be to convince the neurasthenic that he has no organic trouble and that, consequently, his disease is certainly perfectly curable with well-directed and sufficiently prolonged treatment. He should never forget the saying of the English poet: "The best inspirer of hope, the best physician is."

The physician should strive to gain the patient's confidence, listen attentively to the recital of his sufferings, sympathize with him in his troubles, persuade him they are real, and above all, guard against insinuating that they are imaginary. The imaginary patient does not exist in medicine (Déjerine).

The confidence of the patient in his physician is the first condition of cure. By the physician's proving that he always speaks the truth he gains a confidence that begets hope. The physician should give examples of persons that have been cured, consequently reassure the patient of his condition, convince him that all is not lost, and seek to instill in him belief in a cure more or less speedy.

He should, besides, says Dr. Gaston Lyon, persuade him that medicines have but little effect in neurasthenia and that physical agents alone have therein a curative action.

Independently of this moral encouraging influence that the physician is called upon to exert over his patient by words and

conduct, there are many other hygienic means that he can use to happily affect his mental state.

Such means are physical and intellectual rest, "moral diet," distractions, occupations wisely moderated, isolation from city noise and from business, withdrawal from the surroundings in which the neuropathic state developed, a sojourn in the country on in a special hydrotherapeutic establishment.

All those therapeutic agents constitute a valuable fund in the psychical treatment of this category of patients.

Therapeutics of Nervous Depression and Excitation.—To combat these two kinds of symptoms hydrotherapy is, without contradiction, the most efficacious treatment that science knows, but the important point is its manner of application.

It is not a matter of indifference to give a bath, a lotion or a douche to a neurasthenic.

The procedure of choice is the cold douche, broken jet ten seconds' duration, on the trunk and the upper and lower members (the head and neck excepted), and terminating in a full jet upon the feet. This douche is one of the best tonics that we possess, and it will quickly revive the system's forces if applied in a manner to create a rapid reaction.

After the douche the patient should be wiped and massaged, and made to take moderate exercise to facilitate reaction. This douche should be administered only once a day, preferably in the morning, and repeated three times a week. If it be found necessary to give two applications each day, a cold inferior affusion or Scotch douche should be given in the afternoon.

Never should more than two applications be given upon the same day.

After successive experiments prudently made with regard to the susceptibility and tolerant powers of our patients, we have with full knowledge adopted the following as an excellent combination:

A very short cold douche (5 to 10 seconds), slight percussion, each morning, with a Scotch douche in the afternoon. these two applications are repeated every second day.

On the other days, a Scotch douche is given in the morning, and a cold inferior affusion in the afternoon. Continue in this manner for a fortnight or a month, according to the irritability of the patient and afterwards a rest of eight days. This is the best combination we know of, for it is not only

well borne by the great bulk of neurasthenics, but it speedily begets appetite, sleep and nervous energy. It is evident, however, that to produce all those effects it should be continued for a sufficiently long period. One, two, three months are generally required for a stable cure.

With subjects of feeble reaction or excitable subjects upon whom cold water makes a too lively impression, as well as with rheumatic and arthritic neurasthenics, the Scotch douche should be called into service. This latter douche is at once tonic and sedative, and has none of the inconveniences of the cold douche for this category of patients. On the other hand, in forms of neurasthenia where depression prevails, and in the case of cerebrastrhenics, it is the cold douche that succeeds best.

Where the absence of sufficient installation renders impossible the administering of those douches, recourse is had to the wet mantle, cold lotions and baths. But it goes without saying that the last mentioned hydrotherapeutic expedients are not always easily borne, nor are they always sufficient. To resume: whatever hydrotherapeutic procedure is adopted, its applications should be very short, especially in the case of cold water. The mildest applications are often the most effective; while on the other hand, severe applications serve in many instances only to aggravate the disease. This moderation of which authors speak so frequently is found in the very short cold douche, the lukewarm douche, the Scotch douche and affusions.

Another important point to note is that to get the full benefit of the water cure, we must well regulate the effects of the treatment and occasionally change the applications; so that the patient will not get used to it. Otherwise he will not receive the full benefit of the treatment.

The foregoing are, we take it, the general principles that should guide the physician in the application of hydrotherapeutic methods suited for the cure of nervous exhaustion.

Static electricity, also, merits a place in the treatment of neurasthenia.

The patient is seated on an insulated chair in communication with an electric machine. Here he takes a static bath lasting from 10 to 20 minutes, as his case may demand.

In the cerebral form of neurasthenia the electric breeze, or, better still, the electric douche is directed on the head. The same procedure is followed to combat headache and insomnia.

In the spinal form of the disease and in paresis of the members sparks and frictions are applied to the vertebral column and the members.

To be efficacious this mode of treatment has to be kept up for quite a long period. It should be interrupted for a time at the end of fifteen sittings at the most.

The Static Bath is a powerful sedative and at the same time a regulator of the nervous system. In this way it contributes to relieve pains, such as topoalgies, "the *plaque sacrée* of Charcot," etc.

It acts, besides, upon the general state of the system. The ablest living authority on static electro-therapeutics, Professor William J. Morton, M. D., of New York, the eminent Professor d'Arsonval of the College of France, and Dr. Romain Vigouroux, the learned Electro-therapeutist of Salpêtrière, have proven beyond cavil that the static bath possesses the valuable property of augmenting considerably the nutritive changes—a property most beneficial for the neurasthenic who is nearly always at the same time an arthritic, that is to say, slow of nutrition.

Hydrotherapy fulfills almost the same conditions; it tends to procure for the nerves a better nutrition and to calm the excessive excitability of the nervous substance.

Dr. Cheron, in the séance of the Academy of Sciences, August 5, 1895, demonstrated the marvelous effect of this treatment through physical agents in the case of nervous diseases, especially neurasthenia.

He proved to the hilt in that communication that all stimulations brought to bear upon the great sensitive surface, such as douches, massage, baths, frictions, electricity, etc., determined in anemic subjects immediate hyperbolic conditions.

Useless to insist upon this fact; it is to-day completely demonstrated by physiological experimentation and clinical observation that natural and physical agents, these powerful vital agents, whose names are air, water, electricity, sun, rest, exercise and alimentation, must occupy the first rank in the daily treatment of the neurasthenics and the depressed in general.

The air, called by Hippocrates the first of aliments, becomes gradually the first of medicaments. It constitutes with the sun one of the best sources of strength and life for all neurasthenics.

It will then be advisable to occupy sunny rooms and sleep with windows open.

The rest, this powerful means to quiet the excitation and restore the nervous strength, will be prescribed preferably at night by early rest and siesta half an hour before and after meals.

Regarding exercise we recommend generally an ordinary walk between meals, especially before and after douches to facilitate the reaction. But, if our patient is an arthritic, suffering from functional insufficiency of muscles limiting the abdominal cavity, which is the rule in most of the cases, especially among women, give the preference to all exercise which will oblige him to bend the body and ask for some effort; practice them between meals and in open air, so that they will constitute at the same time an air and light cure.

Exercise in all its forms is for the system a veritable support of strength, but in this special condition, it must not only be moderated but also proportioned to the strength of the patient.

Injection of Artificial Serum.—Artificial serum is an excellent therapeutic agent. It may be injected with the compressed-air syringe of Dr. Cheron or Parke Davis in quantities of from 1 to 5 drams, repeated two or three times a week. These injections were given with constant success by Dr. Cheron and Dr. Maurice de Fleury.

Dr. Cheron's formula, which we use sometimes, is as follows:

Carbolic Acid Crystallized,.....	15 grains.
Chloride of Sodium, pure,.....	30 grains.
Phosphate of Soda	1 dram.
Sulphate of Soda,.....	2 drams.
Distilled Water	add 4 oz.

We inject this artificial serum in quantities of from 1 to 2 1-2 drams every second day.

Dr. Maurice de Fleury used the following formula. We find it very good:

Sulphate of Soda.....	} ãã. 15 grains.
Chloride of Sodium.....	
Phosphate of Soda.....	
Carbolic Acid Crystallized.....	7½ grains.
Sterilized Water.....	3 ounces.

The quantity injected begins with 15 to 30 drops and gradually increases to 2 1-2 drams. These saline injections increase the arterial tension and determine an appreciable stimulation of the nerve system. According to Dr. Fleury serum is the tonic par excellence for neurasthenia.

Dr. Crocq of Brussels recommended subcutaneous injections of phosphate of soda in quantities bordering on a grain a day. He considered those injections an excellent nervine.

We refrain from the use of artificial serum in the case of patients with arterial hypertention. These patients are best treated with Scotch douches and static electric baths. This combined treatment has in our practice reduced to normality within three weeks an arterial tension registering 30 on the sphygmomanometer.

But for patients with arterial hypotention the injection of serum is always indicated.

Its effects consist in a revival of appetite and strength, and in a singular re-enforcement of vital energy, which manifests itself in exhilaration of spirits and aptitude for work.

It is, says Dr. Monteuuis, the remedy for all who are able to sustain the struggles of life, the great resource of the depressed, the enfeebled and the eternally fatigued. In combination with cold douches it constitutes the treatment par excellence for those with weak and dilated arteries.

Artificial serum, on account of its very energy should be given with discretion and moderation.

Excursions.—Drs. Proust and Ballet have hard words for practitioners who advise indiscriminately all their nerve-suffering patients to travel. It is certain that in the majority of cases it is only short trips that are indicated, and these should be mainly restricted to the period of convalescence. Little excursions in those circumstances are one of the best means to give easy distraction, and in this way to withdraw the patient from reflections on the derangement of his organs and the deficiency of their functions. The patient should always be accompanied by a friend.

Medical Treatment.—There is no pharmaceutical treatment for neurasthenia. Consequently, but little medicine should be prescribed; the most efficacious remedy, says Brissaud, is iron.

In cases of excitation and insomnia the three bromides, or the bromide of strontium (para-javal) given in small doses and

associated with Indian hemp, or hyoscyamin are helpful. Tetronal, somnos, veronal, sulphonal and especially trional in good doses can also be given. Trional is a sure and dangerless hypnotic. To the bromides may be added arseniate of soda or cocodylate of sodium. Glycerophosphates of lime and soda, as well as kola and lecithine are also recommended; but the best tonic, be it said again, is iron. Of iron choose the preparation most easily supported and most readily absorbed. We prescribe Gude's or Frosst's Peptonate of Iron and Manganese, or again Wampole's Hæmogen.

Alimentation.—There is no special régime for neurasthenia. It is the ordinary mixed régime that is indicated in the majority of gastro-intestinal atonic cases. Three meals a day are sufficient—the chief meal being at noon. Choose in preference dark meats, grilled or roasted without sauce, boiled brains, eggs, vegetable soup, milk and fruits. The quantity of food should be increased not abruptly, but slowly and progressively so as to render superalimentation possible for a recalcitrant stomach. It is an affair of proper apportionment, punctuality and patience. Attend to regularity of meals and to the good workings of the intestines.

Little liquid of any kind should be used at meals. Four ounces of liquid is quite sufficient. Between meals plenty of water may be drunk; but not within one-half hour before meals nor two hours after meals. A glass of water taken on rising from bed and upon retiring at night is recommended. Water between meals and the use of fruit for breakfast, and well-cooked vegetables at dinner, are about the best treatment for obstinate constipation. Water is preferable to alcohol or wine, as a beverage, especially for nervous patients, for water *intus aut extra* facilitates nutrition and remains an element of strength: *aqua robur*—water is force.

If the patient suffer from grave gastro-intestinal atonism he should be recommended absolute rest, which is nearly always a sovereign remedy.

Weir Mitchell's Treatment.—Weir Mitchell in his "Methodical Treatment of Neurasthenia" gives great importance to isolation and rest, to which he adds massage, electricity and superalimentation.

We have recommended isolation in a sanatorium, away from the family and the habitual occupations of the patient. As

regards rest, it will be forced in conditions where a promenade constitutes the only distraction. We admit that rest is in itself a powerful curative means, and that in certain cases it suffices; but we do not favor rest in bed during several weeks, which can only serve to weaken, without utility, the patient. Massage is certainly beneficial. As regards electricity, we prefer, as we have already said, the electric static bath to the induced currents of Mitchell.

The method of the celebrated physician of Philadelphia seems, on the whole, to be insufficient. In that method there is absence of the physical agents of hydrotherapy, light, air, heat and gymnastics.

Physicians and patients have become so cognizant of those deficiencies, as, for the most part, to have given up the method.

A process much in vogue in Germany to combat vertigo and headache is the cold lower affusion. This affusion is well borne, and relieves the brain while toning the system.

Topoalgia.—Topoalgia has been described by Dr. Paul Blocq as a sort of local neurasthenia. It is a fixed pain, localized in a variable but limited region. Against topoalgies so common with neurasthenics we have successfully employed static sparks, Scotch douches, and especially the static induced current or Morton current. Painting with tincture of iodine (*loco dolenti*) gives good results, but it must be applied in several coats so that it may have to be renewed only every five days.

We have seen in consultation with a brother physician a typical case of topoalgia. The patient, Mr. T., experienced marked pain at the lower part of the abdomen. This pain was constant; it had lasted for two years and had resisted all treatments employed. Our examination revealed nothing. We treated it with Scotch douches, static sparks and static induced current (*loco dolenti*), which treatment gave good results.

We have also successfully treated other cases of topoalgia with injections of artificial serum.

Topoalgies are in some cases quite stubborn. We have met traces of them three years after the patient was otherwise perfectly cured.

Conclusion and Résumé.—In keeping with the foregoing exposition, we can, leaving régime out, reduce the therapeutics of neurasthenic states to this principle: "Calm the nervous system, strengthen the patient."

To realize this double indication medicines can take but a small part, for the organism is unable to respond to their action; better far to hold to hygienic and moral treatment in conjunction with rational hydrotherapy and electricity.

This latter method of treatment we have described in its details.

As regards the application of the physical agents, such as water, electricity, etc., we wish to remark that their curative power depends chiefly upon their association in a mixed and complex medication in which each imparts to the organism its proper excitation. Every single line treatment, says Guimbail, every prescription of only one physical agent is, in advance, a failure. A general manifold disease demands a general manifold treatment.

This is tantamount to saying that the "physical therapy" of neurasthenic states should be carried out, as far as possible, in a special establishment capable of realizing at the same time the best conditions of physical and hygienic treatment, repose and isolation.

Against the "general asthenia," that is to say, against insufficiency of nervous potential, are employed all the stimulants of nervous energy, such as hydrotherapy, electricity, rest, saline injections, iron, friction, massage, exercise, open air and sunlight, all of which means are excellent.

Excursions and travel will also lend powerful help, especially during convalescence.

Here in résumé are the general means that are suited for the great bulk of cases; their mode of employment and its duration vary according to circumstances.

In consulting the record of our personal observations to the number of 183 we find that 142 cases of true neurasthenia were radically cured by this method of treatment. In 18 special cases the cure was speedy and remarkable.

An important point to note about those observations is that the majority of the patients had previously undergone the various treatments of repose, isolation, travels, etc., and had proven themselves rebellious to all.

In thirty-four of the other patients there was marked improvement; in fact nine of them should be reckoned as completely cured.

Our seven absolute failures were with patients very strongly charged with hereditary neurasthenia.

The duration of the treatment runs from two to five months; as a rule a good cure is effected in three months.

These results, as remarkable as they are happy, encouraged us to put forward the method that procured them—a method whose elements (static bath, Scotch douches, cold douches, affusions, graduated exercise, open air, sunlight, rest, massage, saline injections, iron, psychotherapy) are not new in their individuality, but whose grouping and judicious application in the treatment of neurasthenia appear to us superior to the methods of exclusive systemization extolled by certain authors.



THE DIAGNOSIS AND TREATMENT OF RHEUMATISM AND ALLIED AFFECTIONS.

BY ALBERT C. GEYSER, M. D., NEW YORK.

Clinical Instructor in Radiography and Radiotherapy at Cornell University Medical College; Member American Medical Association, American Electro-Therapeutic Association, New York State Medical Association, Harlem Medical Association, Medical Society of the Borough of the Bronx, Medical Society of Greater New York, Manhattan Dermatological Society, etc.

(Continued from page 411.)

The Treatment of Chronic Diseases through the Sympathetic Nervous System.

The sympathetic nervous system consists of (1) a series of ganglia connected together by intervening cords, extending on each side of the vertebral column from the base of the skull to the coccyx; (2) of the three gangliated plexuses situated in front of the spine in the thoracic, abdominal, and pelvic cavities; (3) of smaller ganglia situated in relation with the abdominal and other viscera; (4) of numerous nerve fibers which again are of two kinds: the communicating, by which the ganglia communicate with each other and with the cerebro-spinal nerve, and the distributing, by which the sympathetic system comes into close relationship with all the internal viscera and the coats of the blood vessel, by which means it is able to reach all parts of the body wherever blood flows.

The ganglia of these cords lie close to and in front of the

vertebral column, and correspond closely in number to the vertebræ against which they lie, except in the neck, making in all 3 cervical, 12 dorsal, and 5 sacral; the 3 cervical are situated in front of the transverse processes of the vertebræ.

As the two cords pass into the pelvis they converge and unite in the median line to form a single ganglion, the ganglion impar, placed in front of the coccyx.

Each ganglion may be considered as a separate and distinct center possessing communicating as well as distributing fibers: the communicating branches are in relation with other ganglia and with the spinal nerves, while the distributing fibers supply the neighboring tissues. A close relationship is therefore established between the entire length of this ganglionic cord, the tissues, and the cerebro-spinal system.

The three great gangliated plexuses are situated in front of the spine and according to their situation, are known as the cardiac, the solar or epigastric, and the hypogastric plexuses. They consist of collections of nerves and ganglia, the nerves being derived from the gangliated cord and from the cerebro-spinal system and distribute branches to all the viscera, thus again observing the same close and intimate relationship between all the internal organs and cerebro-spinal system.

The third division, or smaller ganglia, are found scattered amidst the nerves and in certain viscera as the heart, the stomach, and the uterus. They also act as centers, possessing communicating branches to send out impulses.

The fourth division, or branches of distribution, are derived from the gangliated cords, from the great plexuses and the smaller ganglia. These are principally destined for the blood vessels, the thoracic and abdominal viscera. They supply the involuntary muscular fibers of the coats of the blood vessels and the hollow viscera and the secreting cells.

In addition to these the five ganglia connected with the third nerve, ganglion of Gasser, Meckles' otic, ciliary, and submaxillary, constitute the entire sympathetic nervous system.

The cardiac plexus is situated at the base of the heart and divisible into a superficial and deep portion. The deep portion is situated in front of the trachea at its bifurcation, and is formed by the cardiac nerves derived from the cervical ganglia of the sympathetic and the cardiac branches of the recurrent laryngeal and pneumogastric.

The epigastric, or solar plexus, supplies all the viscera in the abdominal cavity. It consists of a great network of nerves and ganglia situated behind the stomach and surrounds the celiac axis, extending down as low as the pancreas and outward to the suprarenal capsules.

From the solar plexus we have the following subdivision: phrenic or diaphragmatic, suprarenal, renal, spermatic, celiac, superior mesenteric, and aortic plexuses.

The suprarenal deserves special mention. It is formed by branches from the solar plexus, the semi-lunar ganglion, the phrenic, and the great splanchnic nerves. It supplies the suprarenal capsule. The branches of this plexus are remarkable for their large size in comparison to the size of the organ it supplies. This is of more than cursory significance, inasmuch as it partly accounts for the importance of this organ in the organism.

The hypogastric plexus supplies the viscera of the pelvic cavity. It is situated in front of the promontory of the sacrum, between the two common iliac arteries, and is formed by the union of numerous filaments which descend on each side from the aortic plexus and the lumbar ganglia.

The hypogastric plexus is divided into two lateral portions which form the pelvic plexuses, which in turn form subdivisions forming and supplying the inferior hemorrhoidal, the visceral, the prostatic, the vaginal, and the uterine plexuses.

From the foregoing anatomical review it must be apparent that the sympathetic nervous system is in very close relationship not only with all the organs of the body, but by surrounding the blood vessels, even down to the capillaries, reaches the most superficial as well as the deepest; the nearest as well as the most remote structures of the whole body. Since the presence, and its peculiar anatomical relationship with the cerebro-spinal nervous system and all the organs and tissues of the body is undisputed, it naturally leads to but one logical conclusion, which is that the sympathetic nervous system has a function to perform which it need hardly be said is a most important one.

Physiological Action.—If we review the sympathetic nervous system as a whole, we find that it differs but slightly from the central nervous system. Beginning above in the ophthalmic ganglia and ending below in the ganglion impar, we have this

double chain of ganglia and nerve fibers connected with each other and with the cerebro-spinal system. Every ganglion sends to and receives from the central nervous system, fibers. Each ganglion is capable of acting as a separate nerve center for the particular area to which its own as well as the motor and sensory fibers are distributed. As we know from abundant experiments the specific action of a motor or sensory nerve when irritated, so we have formed conclusions regarding the effects of irritation upon a sympathetic nerve. The result of such irritation is manifested by a change in the local nutrition, calorification and secretion of parts thus stimulated.

When the sympathetic nerve is divided in the neck, we have following immediately a local increase in temperature with a very marked increase in the supply of blood on the corresponding side of the head. The increased temperature is no doubt due to the local exaggeration of the nutritive processes.

Apparently dependent directly upon the hyperemia, there is also a marked injection in the conjunctiva with dilatation of the pupil upon the corresponding side. Should a section of the nerve be made, or a permanent compression be applied, so that these phenomena may continue for two or more weeks, a notable increase in the size of the ear and other tissues thus affected will be observed.

When the distal end of the sympathetic in the neck, however, is irritated with the constant or galvanic current, an entirely new set of manifestations occur. Where there was previously hyperemia with increased temperature and dilatation of the pupil, local amenia is induced, with decrease in temperature and contraction of the pupil. Should the section or ligature be low enough down to include fibers of the celiac plexus, we have a slowing of the heart's beat, as well as a weakening of the heart's impulse. Again, if the distal end be irritated with a very weak galvanic current, we observe at once an increase in force and frequency. As regards secretion, the influence of the current upon the sympathetic is very marked. When the sympathetic filaments distributed to a gland are divided, the supply of blood is very much increased and an abundant flow of secretion follows; whereas if irritated with a weak galvanic current, there will be glandular anemia with contraction and absolute stoppage of its secretion. Neither is it at all necessary in order to produce these various phenomena to resort

to section; the application of heat or cold, the faradic or galvanic currents, light or heavy pressure, certain visual, auditory, or olfactory impressions all serving more or less to bring into action or to interfere to a greater or less extent with the function of the sympathetic or nervous system. All the various phenomena observed in connection with irritation of the cervical sympathetic may be reproduced on all other organs and tissues of the body, if the location for the specific center of the same is known.

From its close and intimate connection with the cerebro-spinal and the arterial system, it has very appropriately been named the sympathetic system. There is not a single act, manifestation, or phenomenon surrounding an individual, either appreciated by his special senses, the motor, or sensory nerves which sooner or later will not enlist the sympathy of the particular system under present scrutiny. If any other name were to be suggested, it would seem that the name vegetative nervous system might properly be substituted for it, for the growth and repair of all tissue is under the direct supervision of the sympathetic nervous system. Believing this to be the fact, it seems reasonable that this system or part of our economy is deserving of the highest of our consideration in the therapeutic application of our various remedial measures.

The Reflexes.—Realizing and appreciating the important anatomical and physiological arrangements of the sympathetic nervous system, it behooves us to consider at least one extremely interesting as well as more or less obscure function of this and the cerebro-spinal system—namely, the reflexes.

All acts must be either reflex or automatic, voluntary or involuntary, or a combination of both, one more or less predominating over the other.

Automatism is a power possessed by certain nervous centers in the cerebro-spinal axis, that is, the power to initiate outgoing impulses independently of ingoing impulses.

Respiration and cardiac action may be mentioned as being truly automatic. Constancy of this automatic action is assured by inhibition and augmentation. Both are subdivisions of the automatism of nervous centers.

Inhibition is, therefore, that automatic function of a nervous center, by virtue of which it holds in check some function of the body.

As an example of inhibition, we may mention the function of the cardiac inhibitory center in the medulla, which by means of the vagi checks the rapidity of the heart's action. This function of inhibition can be augmented reflexly, as when the abdominal sympathetics are irritated with sufficient force the heart may actually be made to cease beating.

Augmentation is, of course, the opposite function by virtue of which they accelerate or augment some particular vital function. The respiratory center in the medulla is constantly receiving impulses tending to accelerate its function, thus causing increased respirations whenever the requirements of the economy demand it: which demand is usually made reflexly.

By reflex function is understood the power of such centers to send out different impulses in immediate response to afferent stimuli. As the ingoing impulse may affect some motor, secretory, or other function, the result of reflexes may be infinitely varied. Three neurons are essential for the completion of a reflex act; an afferent or ignoring neuron, to convey the impression, a recipient neuron at the nervous center; and thirdly, an efferent, or outgoing neuron, connected with some organ that may manifest the reflex impulse. Although generally speaking it is true that the greater the ingoing impulse, the greater the reflex, yet we often find a great disproportion between the two, in that a very limited stimulus will oftentimes cause a most violent explosion of the reflexes. This can only be explained by bearing in mind that each ingoing neuron entering the spinal cord by its proximal process, divides into an ascending and a descending branch which, in turn, give off lateral filaments at different levels of the cord called collateral fibers.

If irritation or ingoing impulses be prolonged, we will first have reflexes on the corresponding side irritated; then on the opposite side of the body; and finally the whole body may be thrown into reflex spasms. This is explained by the presence in the gray matter of the spinal cord of three kinds of recipient cells; (1) the tautomeres, which send their ascending and descending processes (with collaterals) on their own side of the spinal cord (2) the heteromeres, which cross over to the opposite side of the cord, and there send off ascending and descending fibers and collaterals (3) the hecateromeres, which

ascend and descend, with collaterals, on their own and on the opposite side of the spinal cord.

We have now briefly viewed the sympathetic nervous system, its anatomy, physiology, and its close and intimate relationship with the cerebro-spinal and the entire vascular system and the reflexes, which could not manifest themselves except by harmonious arrangement. All of these systems act as a unit.

It will now be interesting to again view this compound and complex system as a whole, and instead of the normal manifestations, pay our homage to abnormal and pathological conditions spoken of as a disease.

Disease is a condition of the body marked by inharmonious action of one or more of the various organs, owing to abnormal conditions or structural changes. We can roughly divide all causes of disease into four general classes, namely: diseases produced by (1) microbic invasion, (2) chemical, (3) mechanical and 4) psychical agents. One of these four or frequently the combined action of some or all of them, is sure to be the foundation of all of our ills.

The particular manifestation produced upon the economy or part of the body depends, of course, upon, first, the cause; second, the particular organ or tissue affected; and third, and most important of all, the reflex effect upon the body in general. This, then, would explain the difference between acute, sub-acute, and chronic, as well as between local and constitutional diseases.

The immediate as well as the remote effects of diseases are twofold: either the effect is hyperemia or anemia of the entire or only certain parts of the system. Hyperemia may be, and most frequently is co-existing with anemia; that is to say, hyperemia may exist in one part of the body, thereby causing anemia in another. The direct as well as the remote effects of either one of these states are too well known to require further consideration here.

Hyperemia must sooner or later bring about congestion, with its train of symptoms; or anemia will cause atrophy and degeneration. The symptoms are too well known, especially in spinal-cord diseases, to justify further elaboration in this connection.

Viewing diseases of all kinds or their causes, within this narrow range of the four causes, and practically only two

effects, our line of therapeutics becomes simple, and as simple as it may appear, it is also effective as well as scientific.

It is not within the scope of this paper to credit or discredit any one sect or particular school of practice, but the dogma advanced above certainly is entitled to more than mere consideration. What is more plausible than to attempt to correct the effects of microbic invasion with antitoxines and anti-germidices, or the effects of harmful chemicals with antidotes, or the injuries from mechanical violence with or by mechanical means from active manipulation down to the application of scientific apparatus, splints, etc., and, again, what is more logical than the art and practice of psychiatry in diseases of the mind?

One of the first principles in the practice of medicine is to remove, if still active, the cause. Frequently, however, the cause cannot be discovered, or if discovered, cannot be removed: we must then satisfy ourselves by treating the effects and assist Nature in her effort to cure disease. As previously stated, the immediate effects usually resolve themselves into hyperemia and anemia, locally or constitutionally. The words effects of the cause should not be mistaken for symptoms, for, as has been stated, we may have a long array of symptoms from these two effects.

Pain is one of the most common symptoms we are called upon to treat. As we may have already seen, all nerves of motion and sensation at their entrance or exit to the spinal canal become closely allied with the sympathetic nervous system, and it is this system, whose office it is to make cognizance of the various sensations, which it receives from all parts of the body, after properly recording and interpreting the same, either in the sensorium or in its own reflex centers of the cord, to so govern the nutrition and blood supply of the parts from whence the painful impression proceeds in a manner best calculated to effect abolition. It is, therefore, only when Nature fails in her attempts, or when our measures are so directed that we assist in her efforts, that the physician plays the greatest rôle. This assistance which we would lend Nature, must be through the same channels through which she would accomplish her purpose, namely, the sympathetic nervous system. No matter what portion or organ of our economy suffers, a reflex center is sure to be found somewhere in the spinal cord. Some of these centers are well known; others are more or less obscure. The sense of pain and sympathy, however, comes to our aid even here.

(To be continued.)

Editorial.

THE LAW AND THE MEDICAL PROFESSION

THOSE who are in a position to know can say authoritatively that irregular practitioners, including osteopaths and manual masseurs, are constantly inclined to add to their means other facilities—the various physical apparatus. They seem to believe that these are not included in the practice of medicine, and that they can consistently employ all the physical agents including electricity, for the treatment of disease.

When it is realized that in the future scientific therapeutics must include the physical measures,—and they will certainly prove of the greatest value in the treatment of disease,—to allow these unauthorized practitioners to employ them is radically a mistake. Those superficially educated in physiology, pathology, symptomatology, and diagnosis are unfit to undertake under any conditions the care of the sick. A pretense at the treatment of the unfortunate constitutes a system of experimental therapeutics which in the interest of humanity cannot be checked too soon.

The decision of the New York Court of Records, as to what constitutes “the practice of medicine” should receive the attention of the medical profession and through their efforts be made the basis of a law to be enacted by the National Government or by each of the States in the interest of public health and safety.

This decision clearly defines what should be considered the proper limitation for the practice of medicine, as follows: “*The practice of medicine is the exercise or performance of any act, by or through the use of, anything, or matter, or by things done, given or applied, whether with or without the use of drugs or medicine, whether with or without fee therefor, by a person holding himself or herself out as able to cure diseases, with a view to relieve, heal, or cure, and having for its object the prevention, healing, remedying, cure, or alleviation of disease.*”

If each National and State Association would appoint a Committee on Legislation, whose duty it should be to induce the enactment of a law using substantially the phraseology of this decision, much would be accomplished, by compelling the adoption of a standard which would exclude the impostors.

At the coming session of the American Electro-Therapeutic Association, the adoption of a resolution and appointment of a committee to aid in carrying on an active campaign in the interest of sound principles, in a matter which so concerns the public health, in every State, looking to the enactment of a law which will comprehensively define the practice of medicine and eliminate the tendencies of unqualified individuals to assume and take charge of the ills of their fellows, would be a step in the right direction.

Such a course cannot be looked upon as a selfish policy of the medical profession, for nothing is more patent to the intelligent layman, than the fact, that all individuals who ride hobbies, making use of some cure-all or one sort of treatment to the exclusion of all others for the sick, are a menace to the community.

* * *

A CHANGE OF NAME FOR THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

THE founders of the American Electro-Therapeutic Association were in advance of the times, and set the pace for the development under an organized effort for the scientific employment of what the future will recognize to be the most important of therapeutic measures. Probably to no other body of scientific workers in the world is so much of the present status of the science due, as to this the first association to be known as devoted to the establishment of the medical uses of electricity. The personnel of the founders was a guarantee of the excellent standard which this organization has always attained, and the quality of work performed.

During the sixteen years since the organization, the progress of development has placed the use of electricity upon a scientific and rational basis, removing many unscientific and erroneous notions, and establishing a growing intelligent recognition of its value.

The broad gauge and intelligent inclinations of these organizers and their accepted associates has turned in other directions, accepting and adopting other physical measures, many of which they have been instrumental in developing. The employment of these other measures in combination with the electro-therapeutic procedures is so often a necessity in the

treatment of complicated cases that it is rapidly becoming an established fact that the physician who would do most for his patient must be more or less proficient in the employment of them all. So important, then, is the requirement of the knowledge of association of these agents that it seems to be a subject for consideration whether it would not be best to place the National Society in a position to deal not only with the electrical methods in its conferences, which place it in a narrow position, but to include the wider field including all of the physical measures.

And if we are to consider collectively the physical measures, would it not be well that the name of the association be made comprehensive, that it may stand in its true light before the outside medical profession? It would popularize the work of the association to adopt a distinctive name, at the same time holding the fact before the profession that the association under the new name is the successor of the American Electro-Therapeutic Association—the parent society to which the profession will always be indebted for advancing the therapeutics of electricity as well as developing the other physical measures. Whether the association be known as the American Association of Physiotherapy or Physical Therapeutics will remain to be determined. That the name should be changed, however, seems to be desirable and in the interest of progress.

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PLACE OF MEETING AND ARRANGEMENTS FOR THE SIXTEENTH ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

THE committee of arrangements of the American Electro-Therapeutic Association has unanimously decided upon the Flanders Hotel, southeast corner Fifteenth and Walnut Streets, as the official headquarters for the members attending this sixteenth annual convention of the Association. The convention will be held September 18-20 inclusive, in the Hall of the College of Physicians, Thirteenth and Locust Streets, Philadelphia, Pa.

The Flanders is but two squares from the Convention Hall and the committee is pleased to report that it has been able to make special arrangements and rates with the management of

the hotel for the accommodations of the members of the Association and guests. This is one of the best hotels in Philadelphia, though not a large one, and is situated but two blocks from Broad Street Station, Pennsylvania Railroad, and is right in the heart of the city. Members intending to come to the convention are requested to notify the Flanders Hotel management at once, regarding accommodations desired. The rates, arranged specially for this Association, are \$1.50 per day, up, for one person, on the European plan.

Arrangements have been made for a fare and a third with the railroad officials for members attending this convention.

Please secure certificate from station agent at point of departure, permitting the attending members and their families to gain the benefit of the reduction in fare. Follow the method of procedure detailed in the August JOURNAL. If living near, do this for the benefit of distant members, as one hundred applications are necessary to get reduced rates.

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PROGRAMME OF THE SIXTEENTH ANNUAL MEETING OF THE AMERICAN ELECTRO- THERAPEUTIC ASSOCIATION.

1. The Past, Present, and Future of Physical Therapeutics. William Benham Snow, M. D.
2. Electricity in Joint Affections. H. Frauenthal, M. D.
3. The Therapeutic Value of the Visible Spectrum. Margaret A. Cleaves, M. D.
4. Proposing of New Methods in Radiography. Prof. Carlo Colombo, M. D.
5. Effects of High-Frequency Currents upon Paraffin in the Tissues. J. H. Carpenter, M. D.
6. Locomotor Ataxia. Francis B. Bishop, M. D.
7. A Résumé of the Radiometric Dosage of Roentgentherapy. M. K. Kassabian, M. D.
8. A Case of Universal Eczema Cured with the High-Frequency Current. A. M. Cole, M. D.
9. Treatment of Lumbago and Other Painful Conditions of the Muscles of the Back. W. Brockbank, M. D.
10. Electricity in the Treatment of Neuralgia. A. R. Rinear, M. D.
11. Electro-therapeutics in Neurasthenia. W. H. White, M. D.
12. On the Use of Radio-Active Thorium in Medicine with Some Experiments. R. Wilson, M. D.
13. Present Status of Electro-therapy. H. H. Roberts, M. D.

14. High-Frequency in the Treatment of Granulated Lids. C. S. Northen, M. D.
15. Electricity as a Factor in the Treatment of Certain Chronic Diseases of the Stomach. Otto Juettner, M. D.
16. Why Use Electricity Therapeutically? W. S. Watson, M. D.
17. The Measurement of the Intensity of the Roentgen Ray an Element of Safety and Uniformity in Therapeutic Results. Sinclair Toucey, M. D.
18. The Diagnostic Value of the X-Ray in Elbow Fractures. E. Gard Edwards, M. D.
19. Concentrated Light Energy. T. Barrett, M. D.
20. Experiments with Light in the Treatment of Various Diseases. H. Finkelparl, M. D.
21. Rhythm the Dominant Factor in Therapeutics and in the Organic World. Samuel S. Wallian, M. D.
22. Roentgentherapy in Tubercular Glands. G. H: Stover, M. D.
23. New Observation on the Value of the Radiant Light Bath. T. D. Crothers, M. D.
24. When are Electro-therapeutics Indicated? A. C. Geyser, M. D.
25. Tubercular Antitoxine. J. D. Gibson, M. D.
26. Methods of Procedure in the Use of High-Frequency Currents as Obtained from the Static Machine. Frederic DeKraft, M. D.
27. A New Direct Reading X-Ray Meter. Geo. C. Johnston, M. D.
28. Electricity in Ocular Therapeutics. S. Lewis Ziegler, M. D.
29. Cataphoric Treatment of Cancer of Face. Saml. McClary 3d, M. D.
30. Clinical Demonstration, High Frequency Currents in Ophthalmic Cases. L. Webster Fox, M. D.
31. Clinical Demonstration, Cataphoric Operation for Cancer. G. Betton Massey, M. D.
32. A Method of Treating Stomach Diseases. Geo. D. Bond, M. D.

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EXHIBIT OF AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

A MPLE space has been provided at the College of Physicians and Surgeons adjoining the meeting room for an exhibit of Therapeutic Apparatus. Blue Prints and terms can be procured from the Chairman of the Committee, Dr. A. R. Rainear, 2024 Diamond St., Philadelphia, Pa.

Progress in Physical Therapeutics.

CONSTITUTIONAL DISEASES.

EDITED BY FRANCIS B. BISHOP, M. D.

Dyspepsia. Clinical Medicine, August, 1906.

The time was when the treatment of chronic gastric indigestion or dyspepsia meant an off-hand prescription of bismuth, pepsin or charcoal, or a bitter tonic with a mineral acid and perhaps a cursory allusion to diet and little or no preliminary examination of the patient as to exact conditions at fault. As a consequence chronic digestive disorders are very frequent and call for daily consideration. Most cases of stomach dyspepsia yield readily to appropriate medical treatment, but there are many who have not received benefit from drugs, lavage, electricity, hydrotherapy, exercise, and diet, to whom surgical intervention offers the only hope of restitution.

[In gastric ulcer, stomach dilatation with or without gastrop-tosis, acute gastralgia, flatulent colic, and general atony, remarkable results are obtained from the static wave-current by applying a large metal electrode over the epigastrium.—Ed.]

RADIOGRAPHY.

EDITED BY HERMAN GRAD, M. D.

Modern Skiagraphic Technique. By Vernon J. Willey, A. M., Ann Arbor, Michigan. The Physician and Surgeon, May, 1906.

"What is meant by a good radiograph? What should it show? How shall we judge whether or not it is technically correct? First of all it is well to be clear on one point: a radiograph is not a photograph. It does not represent by its shades and shadows, the real object. It is a record of the different densities encountered by the Roentgen rays in their passage through a body made up of materials presenting different degrees of obstruction to the passage of the rays. . . . The radiograph is a record of the densities of the different parts or organs through which the rays pass to reach the sensitive plate, and may or may not be easy of recognition; in not a few instances it requires a radiographically trained eye for its correct interpretation. A good radiograph is one which, first of all, renders a truthful record of these densities, and is simple and easy of interpretation. Negatives must be produced showing the greatest possible contrast between tissues of different density. The differentiation must be sharp and clean cut, the neg-

ative clear, clean, and free from fog and haziness. . . . Theoretically one should be able to show by a radiograph any pathological condition involving a marked change in density of the involved tissues. Practically we are able to realize this to a very satisfactory degree, but it is useless to place much reliance upon a skiagraph which has not truthfully recorded normal structures which differ more in density than the change from normal to pathological.

The production of a radiograph fulfilling the necessary conditions depends upon:

First, properly selected electrical apparatus kept in perfect working order.

Second, properly selected and properly excited vacuum tubes.

Third, suitable accessories for diaphragming the rays, and for immobilizing the part radiographed, and

Fourth, reliable sensitive plates or films, followed by correct and special photographic technique.

The electrical apparatus, static machine, induction coil, or high-tension transformer should be one with which the operator is thoroughly familiar. If he expects to progress further than the the elements of the subject, embraced in the radiography of extremities, he will require an induction coil capable of delivering at least a nine-inch solid flame, and preferably one delivering more than a fourteen-inch flame. The apparatus must be adjusted, and supplied with controlling rheostat and variable inductance, as to respond at once to his varied requirements. If he is to attempt rapid work, the primary circuit must be broken by an electrolytic interrupter preferably of the Wehnelt type. This invention of Wehnelt has done more than any one thing to make possible the extensive use of Roentgen rays in diagnosis." . . .

"The fundamental requisite of the Roentgen tube is that its rays must penetrate the tissues to be radiographed. The thicker the tissues or the greater the density the greater must be the penetration." . . .

"The penetration of the tube is a perfectly measurable quantity, and its actual measurement is an important advance in bringing about improvement in and uniformity of methods."

A simple form of penetrometer may be made by a combination of the Benoist penetrometer and the aluminum window penetrometer. Cylinders of aluminum, of two, four, et cetera, to sixteen millimeters in thickness, and about eight millimeters in diameter, are cut from a rod of aluminum, and the eight cylinders set in apertures in lead, the first four in lead one-half millimeter thick, and the remaining four, ten to sixteen millimeters thick, set in apertures of a strip of lead one millimeter thick. The device is then glued to a thin board, and placed in front of a small fluoroscope. Tubes whose rays penetrate freely the first four or five aluminum cylinders, and the one-

half millimeter lead strip not at all, are "soft" tubes, or "low tension" tubes, although the latter term is a misnomer. Tubes whose rays penetrate all the cylinders and the one-half millimeter lead strip to some extent, are "hard" tubes, or "high tension" tubes. The terms hard and soft are purely relative, having to do only with the penetration of the rays."

"The Walter penetrometer is the international standard. Soft tubes penetrate four or less platinum windows, while hard tubes penetrate from five to seven windows. Tubes are now designated as Walter 4, 5, 6, or 7, according to their penetration." . . .

"Besides being of correct penetrating power the tube must be capable of enduring a heavy current (amperage) for the required time of exposure, that is one-half second to six or eight minutes, without over-heating, lowering of vacuum and lessening in penetration. . . . If a hard tube be used, it is preferable to use one which has been aged or seasoned to the degree where it will emit rays of a nearly homogeneous character, rather than a mixture of rays varying from those of extreme softness to those of extreme hardness." . . .

"At present there is no simple and satisfactory method of measuring directly the volume of rays given off by a Roentgen tube. The nearest approach to it is the measurement of a function which is proportional to it, namely, the current exciting the tube. A milliamperemeter constructed to be used in series with the tube indicates, for a given tube excited by the same apparatus, a current strength proportional to the radiant output of the tube. Or more strictly speaking, the volume of rays is proportional to the square of the current strength, provided the resistance of the tube and the penetration remains constant. This is very nearly realized in practice, radiographically, for, in exposing a structure for radiographic purposes, if two milliamperes through the tube requires an exposure of sixteen seconds, four milliamperes requires not eight seconds, but only about four, and a radiograph may be made of the part exposed in one and one-half to two seconds if we can excite it by six milliamperes. It is possible to secure a good radiograph of a one hundred and fifty pound man in one second, by using a Walter 6 tube, excited by six milliamperes, from an induction coil actuated by an electrolytic interrupter."

"With reference to the penetration of tubes employed in radiography, Roentgenologists are divided more or less sharply, into two schools, advocates of soft-tube technique, with attendant long exposures, employing Walter 3 to 5 tubes, and users of hard tubes, Walter 5 to 7, requiring exposures of one-half second to ten seconds, for radiographing any part of the body, while the Walter 3, 4, or 5 tube requires from twenty seconds to six minutes exposure to do the same work. So far

as I know, there are no radiographers who are equally skilled in the use of both hard and soft tubes.

"At first thought it might seem that the advantages are all with the use of the Walter 5, 6, and 7 tubes. This, however, is not true, as soft tubes, Walter 5 or less, possess the undeniable advantage of giving greater detail and contrast in soft parts, especially radiography of abdomen and chest, than the average hard tube. In other words, we are able, by using the soft tube, to record upon the plate more marked differentiation between tissues differing but slightly in density. In addition the likelihood of overexposing the plate is very much less than when using the hard tube. On the other hand there is the greatest danger of "burning"—it is the rays of slight penetration which produce changes in the integument.

"The difficulty of immobilizing the patient during the long exposure, the absolute impossibility of radiographing lungs and abdomen during suspended respiration, and the numerous failures in attempted radiography of small children who cannot be kept from moving during the exposure, are drawbacks which have from time to time annoyed and discouraged the user of the soft tube. The greatest trouble of all, however, is the rapid heating of the soft tube under heavy current excitation, its quickly lowering vacuum following this, and the resulting lessening of the penetration rendering the tube for the time absolutely worthless for radiographic purposes. . . .

"The use of the diaphragm for cutting off the indirect rays is of the greatest service, particularly when using a comparatively

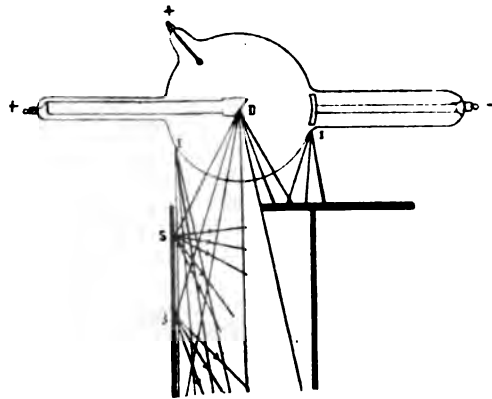


Figure 1.—D, Apex of cone of direct rays; I, Indirect rays from walls of tube; S, secondary rays from cylinder wall.

new hard tube. A scientifically constructed diaphragm, with its accompanying compression cylinder or compression ring,

is a necessary accessory to every fully-equipped radiographic armamentarium.

"It is perfectly possible to make a radiograph by means of these secondary X-rays generated from the inside of the cylinder of improper construction. The direct rays may be intercepted by a thick lead disk, and the secondary X-rays (Figure I), allowed to pass through the structure to the radiographed. On the other hand their production may be eliminated by the proper diaphragm, while at the same time minimizing the transmission of indirect radiations from the tube. The accompanying diagram (Figure I) illustrates, in the left-hand half of the figure, a cylinder of improper construction, with its indirect and secondary rays, while the right half shows how these may be eliminated by the diaphragm of correct aperture. A diaphragm apparatus of nearly universal application may be constructed by covering a suitable-sized board or fiber support with a layer of a mixture of putty and mercurous oxide on the side next the tube. A convenient aperture, of from five to eight centimeters, is left in the center. This diaphragm, being a non-conductor, non-magnetic, and non-inductive, may be

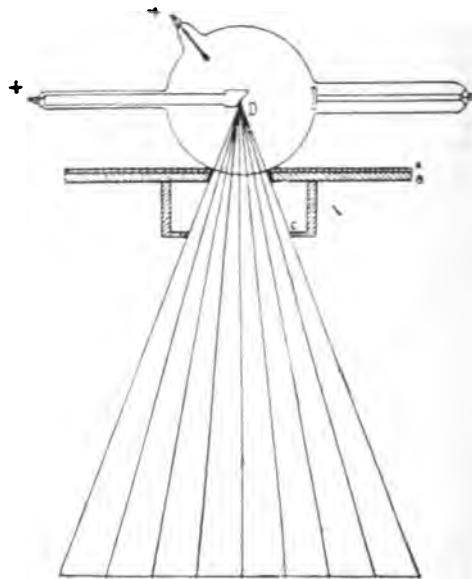


Figure II.—A, Layer of putty and mercurous oxide; B, Wood or fiber support; C, Metal diaphragm; D, Cone of direct rays.

placed in direct contact with the tube. Suitable lead diaphragms may be employed for further limiting the field covered by the rays, and two or more rings may be detached to the

under side of the diaphragm for purposes of compression or immobilization. The diagram (Figure II) will make clear its construction.

"The compression rings of seven and one-half and ten inches in diameter, in addition to a five and one-half inch cylinder, will fulfill about all of the requirements demanded of such apparatus by the radiographer.

"Lastly, I wish to mention briefly the photographic technique. The radiograph is a special negative. It should possess strong and emphatic contrasts. Two of the most important factors in the production of the best grade of radiographs are the correct exposure, and the correct developmental technique. The physician who exposes his plates, and then passes them on to a portrait or landscape photographer for development, will not obtain the highest grade of work, until both learn by experience the important difference between a landscape or portrait negative, and a radiographic negative. A different developing formula and a different duration of development are essential. Especially is this true if the hard tube technique be employed."

The X-Ray and Diagnosis of Intrathoracic Morbid Conditions.

By W. H. Read, M. B., Ch. M., *The Australian Medical Gazette*, November, 1905.

The writer considers both fluoroscopic and skiagraphic examinations of the chest as of importance, more particularly the former. The fact is that the constant movement of the bony thorax, heart, and lungs, "serve only to blur and erase details on the sensitized surface, whereas these same movements are a distinctive advantage when making a screen examination." He advises the use of a screen large enough to receive the shadow of the entire chest, which should be kept as close as possible to the patient to avoid distortion; and recommends the use of a fairly low vacuum tube and as strong a current as we can employ without running the risk of injuring the tube.

The patient may be examined sitting or standing and it is often an advantage to raise the arms above the head. In cases of suspected pleuritic effusion, the patient should be examined in different positions for the purpose of noting the level of the fluid. Examinations should be always made from both sides. The heart appears as a well-defined shadow, as do also portions of the thoracic vessels. To recognize the alterations in cardiac outlines, a good plan is to map out the normal shape of the heart with fuse wire fastened to the chest by means of an ordinary plaster. We then examine with the screen and note the relative conditions.

A study of the movement of the diaphragm is of great importance in systematizing the extent and severity of the pulmonary lesion. The diaphragm is held to the vault of the liver which is opaque, offering a striking contrast to the translucent

lungs. On the right side it appears as a well-defined wall, the shadow of the heart and that of the inner portion of the diaphragm, so that the diaphragmatic line is here more or less defined. The outer portion of the left diaphragm, however, can be well seen and during deep inspiration a clear interval appears between the heart and the diaphragm, which shows as a well-defined wall across the whole extent. During deep inspiration the diaphragm shows up most clearly, as the lungs contain more air, and are consequently more pervious to the rays. During deep inspiration the diaphragm is flatter and more compact, consequently less pervious, thus increasing the contrast. During expiration, on the other hand, the diaphragm is less distinct for the opposite reason.

The extent of the diaphragmatic excursions vary from one-half inch in quiet expiration to two inches in deep. The highest point of the diaphragm should reach normally to the level of the fifth rib on the right side, and one space lower on the left. In anterior irradiation, rays passing from the front show the vertebral column, the sternum, ribs, and scapula to the best advantage, with the heart to the left of the spine casting a triangular shadow. The heart shadow appears much larger when examined from the back, because it is farther from the screen. X-ray examinations should always be done in conjunction with the ordinary clinical examinations.

Examinations of morbid conditions.—In hypertrophy the heart shadows increase and the apex is displaced, and the clear space between it and the diaphragm during deep inspiration may be diminished or disappear.

Aortic dilatation may be seen as well from the back as the front with pulsations detected. The margins of the large shadow, which is usually fusiform not bulging as in cases of aneurism. Aneurism of the descending aorta is seen best from the back, preferably to the left of the spine, and separated from the cardiac shadow by clear intervals.

In all these cases the heart is seen to be displaced, usually downward and to the left side.

Foreign bodies in the trachea or esophagus can be easily located. In esophageal strictures we can determine the seat of the stenosis by making the patient swallow a capsule containing subnitrate of bismuth which is opaque to the rays. "The appearance of the diaphragm in diseased conditions is of great importance." In most cases of tuberculosis, it may be noticed that the diaphragm is moving less on the affected side, which occurs in very early cases, so that it may be considered as a diagnostic sign, so that we may say upon examination if we find no shadow of the lung and normal movement of the diaphragm, that there is no serious inflammation of the lung*tissues.

Pleuritic effusion and various abdominal conditions as drop-

sical or hydatids of the liver will vary the diaphragmatic movements.

Skiagraphy, if employed, should always follow the screen examination for the purpose of determining the best position in which to place the patient in order to get the best representation on the sensitized plates of the diseased condition. The plate should be placed against the front or back of the chest that the region, which we intend to photograph, may be best shown. To obviate blurring get the patient to hold his breath during the actual exposure. In conclusion the writer says that he looks upon the "technique of the X-ray in diseased conditions of the chest as an exceedingly difficult one, and one requiring great care and patience."

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

Roentgen Therapy of Tubercular Glands. G. H. Stover, M. D., Denver Medical Journal.

After recounting various methods of treating this condition the author considers two methods only to be used—surgical and radiotherapy. Surgery, he says, if not well done, and a complete eradication of the diseased tissues secured, had better be left undone. He considers the X-ray very useful in these cases, and while not claiming it to be a cure for every case, he reports several cases in which it was used with marked success. He has used in these cases artificial fluorescence, as suggested by W. J. Morton, M. D., but seems to have been doubtful of its utility, but employed it to give the patient the benefit of the doubt. The first case reported was in an extremely bad general condition, and was "a whole hospital ward in herself," for the number and variety of complications. She had two tubercular glands on the right side of the neck, one of which had been suppurating for several months. The surgeon stated to him, when sending the patient, that if she lived very long it would be a miracle. The suppuration ceased under the X-ray and the other gland disappeared. The former hopeless invalid is now a self-supporting member of society. The second case reported has had tubercular glands for several years. They have been opened and pus evacuated repeatedly. When she came to him, there was an immense mass on each side of the neck, extending from the lobe of the ear down into the shoulder and a mass under the jaw. She was treated steadily for one year, and now, nineteen months after the treatment was completed, an observer, standing a short distance away, would notice nothing abnormal. The third case, a boy, had tubercular glands on each side of the neck. He was a delicate-looking child,

whose mother died from tuberculosis. He was treated for five months, at the end of which time no trouble was apparent, and he had gained considerable in weight. Twenty-one months after treatment he is well and a healthy-looking boy. Case number four was a girl of ten years, daughter of a tubercular mother. This patient had a number of tubercular glands on the right side of the neck. On the left were several enlarged glands, one of which was as large as a pigeon's egg. She is still under treatment. The gland on the right side has practically disappeared. The fifth case presented masses of large glands on each side of the neck and under the jaw, under treatment at present, they have greatly reduced in size, and are now represented by hard lumps, composed probably mostly of fibrous tissue. The sixth case had scrofulous glands in both groins, a large and acutely inflamed one in the left axilla, a chain of quite small ones in the right side of neck, a lump the size of an almond in the right breast, and a number of quite large mesenteric glands could be palpated in the abdomen. She had suffered from diarrhea for a long time and had daily rise of temperature and was not a very promising case. Fluorescein was used in conjunction with the X-ray. After fourteen treatments her fever disappeared, and after the nineteenth exposure her diarrhea disappeared. After twenty-one administrations, the treatment was discontinued and after her vacation, when she returned to the office, she was in better health than she had been for many years. The lump in the left breast is hard and only one-fourth its former size, and only traces of the glands in axilla are found. The seventh case has had occasional swellings of the glands of the neck for eight years, which have been gradually increasing in size for the past six years. When she came for treatment, there was a chain of large glands on each side of the neck, and a number under the chin. She received fluorescein in conjunction with the X-ray. After fifteen exposures all the glands in the neck were gone and the others were smaller. After twenty-three exposures treatment was discontinued.

X-Ray Treatment of Affections of the Skin. By J. N. Scott, M. D., Kansas City, Mo.

The X-ray is being used all over the world in treating diseases of the skin, and is especially successful in cases of epithelioma, rodent ulcer, lupus, acne, psoriasis, eczema, keloid, etc. He called attention to the success and failure in the early days of radiotherapy by want of a proper idea of dosage. He points out that the ray in small doses is a stimulant to all tissues. In slightly larger doses it is a local alternative, that is, it will cause a destruction of the skin, but the process is so slow that new skin will have formed when the destroyed skin peels off or is absorbed. When the skin and underlying structures are

destroyed en masse, the effect is known as an X-ray burn. This condition is very bad, heals slowly and is never produced intentionally on healthy tissue. The more embryonic in character a tissue is the easier it is destroyed. The ray seems to have especially selective action on epithelioma. This is proven, he thinks, by being able to destroy an epithelioma, without even producing a dermatitis of the healthy skin. He calls attention to the latent effects of the ray, points out the difference between it and the ordinary escharotics, which act at once, how the effect of the ray, if a burn is produced, will not take place until from three or four days' to four weeks' time' from exposure. Even under microscopic examination, the tissues show no change, until the destructive inflammation begins. He also calls attention to the fact that personal resistance to its effects is lessened by repeated exposure, and the system cannot accommodate itself to larger doses, as it does with drugs. He called attention to his own experience, where he at one time could remain exposed within a few feet of an active tube with immunity, while now he feels the effect if he is near one in action for a few seconds. He rejoices that now the X-ray specialist has decent cases of epithelioma to treat. He considers that in epithelioma of the face, in which the tissues involved are not more than two inches in diameter, that the X-ray, properly applied, will cure ninety-five per cent. of these cases. As the area involved becomes larger, the involvement deeper, the per cent. of cures will naturally drop rapidly. The cosmetic results obtained in such cases are undoubtedly better than those obtained by any other method. Skiagraphs were shown to prove this assertion. He exhibited a case of rapidly growing epithelioma of the nose. The microscopical examination of which was as follows: "The growth on the nose is an epithelioma and the structure is that of the most rapidly proliferating variety. The growth was progressing so rapidly, that the characteristic epithelial features had not the time to form, so that the microscopic picture is full of festooned masses of squamous epithelium throughout the tissues involved. There has been practically no reaction on the part of the connective tissue by the growth.

"The connective tissue is edematous and empty of round cells. The growth is almost, if not quite identical, in structure with the one you have removed from the tip of the nose of Mrs. Anderson a while ago. I hope you will be as successful with this one."

This growth continued to get larger for three weeks in spite of X-ray treatment, but at the end of this time, the growth came under control of the ray, decreased in size, and progressed to a cure. He calls especial attention to the excellent cosmetic results obtained.

In the treatment of lupus, he uses both the X-ray and the ultra-violet light, but if the area is large, he prefers the ray.

He believes that the X-ray is not a germicide, and the effect produced in the treatment of lupus is one of stimulation to the healthy tissues, so that it produces the cell in which the tubercular germ will not grow. The same principle he applies to the treatment of acne, psoriasis, etc.

Metabolism in Leucemia during X-Ray Treatment.

Rosenstern finds that there is a diminution of the leucocytes in leucemia under the influence of the X-ray treatment associated with an improvement of the general condition, and concludes that the cause of this diminution of the leucocytes is not due to an increased destruction of them, while they are produced in the same quantity as before the inauguration of the treatment, but is due to decrease in the number of these elements formed, and that this diminution in the number formed is to be considered a result of the effect produced by the X-rays on the organs where the leucocytes are produced.

Specific Leucotoxins in the Blood Serum as the Result of the Use of X-Rays. N. Y. Med. Jour., June 9, 1906.

Klieneberger and Zoppritz refer to the X-ray treatment of leucemia as the only one known at present, which may produce a good result, although it very frequently fails, and reviews the ideas which have been advanced to explain the manner of action of the rays. For the purpose of trying to elucidate this subject they instituted experiments which show the leucolytic action of the blood serum of men who have been subjected to the X-ray, both in test tube and in animals. They demonstrate the Roentgen toxine in the blood serum in test tubes. Thus they show the immediate influence on leucocytes exerted by the serum of men who have been treated by the X-ray, the similar influence on ameboid motility, and give the result of the experiments with human pus, exudate and transudate cells, as well as experiments with leucocytes taken from the lower animals. The authors conclude that a cell poison, able to change human leucocytes in vitro, a Roentgentoxine, is not produced in the blood serum of patients with leucemia, pseudoleucemia, or lymphosarcoma by the use of the X-ray. They then pass to their experiments on animals, whence they conclude that a hypoleucocytosis is not constant after the injection of Roentgensera, and, that this hypoleucocytosis may also follow the injection of an inactive serum, or of the serum from a patient with leucemia, who has not undergone treatment.

STATIC ELECTRICITY.

EDITED BY J. H. BURCH, M. D.

A New Static Modality.—Dr. Chas. Sinclair Elliott of Kansas City, Mo., sends the following description of what he believes to be a new static modality:

"About six months ago Dr. I.C. Soule and I were experimenting with the static current—trying its effect in various ways with vacuum tubes. One effect has proven marvelous in its therapeutical action, namely: one pole of the high-frequency resonator is connected to a large-sized Leyden jar which is connected with one pole of the static machine, the other cord of the resonator being simply thrown down on the floor. The other pole of the machine is grounded by means of a chain, and not connected with the Leyden jar of that side. When a vacuum tube is then connected with the resonator and the sliding rods slowly separated you get apparently the same effect as the wave current, but it does not require that the patient be insulated. The current thus induced causes contraction of muscular tissue, the contractions being very energetic and increasing in intensity as the sliding rods of the static machine are separated. The spark-gap should be gradually increased to the tolerance of the patient. The muscular effect is particularly noticeable when a tube with a leading-in wire is used. With the regular vacuum tube these muscular contractions are not so severe and are finer. Then again the appearance of the light in the vacuum tube is distinctly different than when both poles of the resonator are connected with both poles of the battery.

The therapeutical action seems to combine that of the vacuum ray with that of the wave-current—in fact it is a combined wave- and ray-current.

I have had some very remarkable results with this current in deep-seated inflammations, especially in tubular, uterine, and in prostatic troubles. In some instances the results have been almost like magic. Its action on indurated, enlarged, and painful glands has proven most highly satisfactory; the same is true in cases of muscular rheumatism, lumbago, and joint affections."

[This current simulates the effect derived by connecting the vacuum tube to one side of the machine, grounding the other side, and regulating the spark-gap to the toleration of the patient, as with the wave-current. When so employed the effect is more pronounced, as a longer spark-gap can be employed, with the patient insulated.—EDITOR.]

Therapeutics of Static Electricity. By Geo. D. Bond, M. D., Hillsboro, Texas. Texas Medical News.

The writer calls attention to the fact that the presentation of this subject must face to overcome the prejudice of physicians who have had no experience with it, and others who having use it in a "haphazard way, without special training," by failure have acquired a prejudice greater than if they had never tried. He also calls attention to the fact that the absence of training in the medical schools of the past makes it necessary that the physicians who would use electricity scientifically, must seek it from living teachers in existing post-graduate schools as well as books. He also calls attention to the fact that most European universities have endowed a chair in electro-therapeutics, and some of our American schools have followed suit. Electricity, in the form of "Galvanism and Faradism," he says, has received most attention in the past because the apparatus is less cumbersome and expensive and also for the reason that the usual text-books leave the impression that in them is encompassed all that is useful in electricity. "On the contrary, their value is exceedingly small compared to that of static electricity,—is the verdict of most of us who are foremost in this work. Most that can be done with Galvanism can be done better with the static machine since the discovery of the Morton wave in 1899." He speaks favorably of the advantage of the static over the other currents attributing in the main the advantage of the small amperage relative to the extremely high voltage of the static current. Explaining that it is not by the quantity of electricity thrown into the tissues, but the force with which it is thrown that derives the most valuable effect. The varied and diverse currents of high potential and some of them of high frequency derived from the static machine give it a wide range of possibilities.

This fact is attributed to the valuable currents of Dr. William James Morton, and to their value in combating hyperemia and congestion, resulting in relief more or less of permanent blood stasis. For this reason, "most functional disturbances are subject to its control and by its continued daily support of function, repair of the structural impairment is often permitted. Experience shows that the effects at this high pressure of electrical excitation continues from twelve to twenty-four hours, gradually requiring less frequent treatments, until in many cases normal conditions have become established." The writer believes, "that chemical action and electrical force are one and the same, and not cause and effect; that if electrons compose atoms, and atoms are the only component of matter, that any change in matter, either chemical or mechanical, must involve change in the arrangement of the electrons within the atoms, and thereby invoke an electrical force."

Static electricity charges the patient only as he remains on

the insulated platform. Its direct action is only while the current flows into or through the subject, its great potential forcing it into or through all the tissues at a speed almost beyond human comprehension, and thereby clearing up and stimulating the dormant and clogged electrical forces of the economy. The writer reports the following cases:

Case I. Male, aged forty-three, under observation for ten years, during which time he had suffered from "frequent attacks of severe colic, accompanied by copious vomiting, confining him to the bed for three to fifteen days at the time of attacks, requiring the use of frequent hypodermics." The attacks became more frequent, resulting in the vomiting of large quantities of blood. Electrical treatment was begun, the patient being brought to the office daily for two months, and then on alternate days during which time there was but one attack lasting three days. After the first two months the periods of treatment were lengthened until one year—since which time he has required no treatment. The treatment consisted of the Morton wave-current administered with a large electrode over the stomach, connecting the patient with the outside of a Leyden jar, instead of directly to the prime conductor, as is done in the original Morton current.

Case II. Female, aged sixty-two, had continuous pain in the left arm half way between the shoulder and the elbow which felt as if something hard were pressing against the bone. This was treated for muscular rheumatism, but gave no relief. The patient's life was seriously impaired from long-continued pain and loss of sleep. The treatment was the static-induced current strong as could be borne without discomfort for fifteen minutes with one electrode on dorsal region, and the other over the seat of pain. Relief was immediate, returning slightly only for three mornings. After the first treatment sleep was normal. Fifteen treatments were given and eighteen months since there has been no return. The case was diagnosed to be neuritis.

Case III. Male, two and one-half years of age. Anterior poliomyelitis of three months' duration involving one arm and one leg complete. A movement of the arm was observed after the second day's treatment, and of the leg after five days. After sixty days' treatment recovery seemed to be complete but treatment was continued on alternate days for another thirty days. Sixty days after treatment was discontinued the patient remained well. Treatment consisted of the Morton wave-current applied with a long, narrow electrode over the spine.

CURRENTS OF HIGH FREQUENCY AND HIGH POTENTIAL.

EDITED BY WALTER H. WHITE, M. D.

The Remarkable Effects of Electric Currents of High Frequency when Applied to Malignant Growths of the Skin.
Professor Doumer in *Le Nord Medical*, April, 1906.

Malignant growths of the skin, regarded by surgeons generally as unfavorable, have been reported as favorably treated by Rivière, Oudin, and Lociale by high-frequency currents, by showering sparks upon the affected surfaces. Prof. Doumer reports two cases cured by this method.

Case 1. A man in good general health but affected slightly by arteriosclerosis had a violet-colored growth on the right temple the shape of a bean on the line of irritation of the hat band. This growth had increased steadily in size instead of its becoming bosselated, bleeding easily from slight irritation. There was a fissure between the lobules of the growth which discharged a thin and serous fluid. Around the edges of the growth was an erythematous areola. Pressure with the finger would diminish the size but the tumor would resume its regular form and size when the finger was removed. Surgeons refused to operate and advised against interference. Doumer employed a special electrode (a stylet electrode) connected with the pole of Oudin's resonator which gave out sparks of three to four millimeters in length. Under the shower of sparks the tissues appeared as if cauterized and a large drop of blood formed on the surface. The application was made for two minutes. After one week the patient was examined when the growth was observed to have shrunk and was covered with a parchment-like layer which was horny in places. The former treatment was then repeated. A moist compress was applied a few hours preceding the third and last application which was administered one week later. A few weeks afterward the crust had fallen off showing a healthy skin beneath. Only a small spot of redness remained which will probably disappear. As the patient did not return for two months it was taken as evidence that the result was permanent.

Case 2 was a man, fifty years of age, presenting a tumor of fairly rapid growth near the extremity of the left eyebrow. It was round in shape, red and compressible without pain. It had been dormant for two years, taking on a rapid growth during the last six months, during which time the color had become much more intensely red. The surface would bleed upon the slightest contact. The X-rays were employed with some degree of success but the progress was too slow. The method of Rivière was then employed with sparks of high frequency. The first application lasted two or three minutes, causing consider-

able pain. After one week a hard crust had formed over the surface and the application was again repeated. Two weeks later the growth was found to be much smaller and the crust which had formed was on a level with the surrounding skin. The patient was seen again six weeks after the first treatment when the crust had fallen off leaving a slight scar. This patient has been seen several times during the past year and there has been no sign of recurrence.

The curative effects were attributed to the chemical or thermal effects of the discharges. It is possible that the increased activity of the cellular metabolism produced by the electricity had contributed to the result.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

Toilet of the Anus.

A. G. Miller (in Scottish Med. and Surg. Jour.) believes that a vast variety of organisms are conveyed by the hand from the anus to other parts of the body, and that in addition, pathologic conditions of the anus are often the result of imperfect cleansing. These affections generally cause itching, and thus the hands are still more infected. He advises that in addition to the use of toilet paper the anus should be carefully washed with soap and water, with the skin put on the stretch after each defecation, this to be followed by thorough cleansing of the hands and nails themselves. He thinks that many cases of pruritus ani, boils, fissure, and even inflamed piles, might be prevented by proper cleanliness.

Alkaline Beverages in the Treatment of Pneumonia. By J. B. Todd, M. D., New York Medical Journal.

In order to promote leucocytosis throughout the course of the disease and to preserve the proper alkalinity and specific gravity of the blood Todd advises the administration of alkaline saline drinks, from the inception of the disease throughout its entire course. Of a solution of two and one-half grains of sodium chloride and one grain of potassium bicarbonate to the ounce of cold water, from six to eight ounces should be given every two hours. The addition of a teaspoonful of lemon juice converts it into a refreshing effervescent drink. A generous diet, a well-lighted room, and an abundance of oxygen are essential. Todd says that the administration of alcohol, strychnine and the so-called heart tonics in pneumonia is analogous to sustaining a starved horse with a whip when he fails to draw his load. He does not condemn these remedies absolutely, but says that in his opinion there has been no occasion for their use.

Suggestion as to the Treatment of the "Spotted Fever" of Montana. By P. M. Ashburn, M. D.

Ashburn (*The Journal*, May 27, 1905) recommends in the treatment of this disease the Brand treatment of typhoid, plus the occasional use of normal salt infusions and a few medicines, principally calomel, alcohol, and strychnine. He advises the immersion of each patient presenting a temperature of 102.5 F. in water having a temperature of 70 F., and keeping him there, constantly applying hand frictions to the body and limbs, with cold applications to the head, from ten to twenty minutes, according to effect, repeating this procedure every three hours as long as the temperature remains above the point indicated. This bath should be preceded by the administration of a stimulant (Ashburn prefers alcohol), and followed by a quiet rest in bed, under blankets, and, if necessary, with hot-water bottles at his feet. Ashburn sounds the following note of warning: 1. That the lower the temperature of the water (below 60 F., say) the greater the contraction of the blood vessels of the skin, the slower their consequent dilatation, and the smaller the reduction of temperature and the greater the internal congestion. 2. That without friction a moderately cold bath (70 F.) may do harm in the same way, and may fail to reduce temperature. 3. That until reaction occurs the circulation is not benefited and that to hasten reaction by friction is absolutely necessary for this reason also. 4. That the effect on the circulation, because in that way the condition of the skin, kidneys, lungs, nervous system and temperature itself are beneficially influenced, is the most important object to be attained. 5. That water not cold enough does not cause the primary spasm of the skin vessels, without which the tonic dilatation does not follow. 6. That alcohol or hot coffee by the mouth and ice water by the rectum add to the efficiency of the bath and hasten reaction. 7. That, while the temperature may be used as a guide within considerable limits, the circulation being most what we want to influence, the baths should be given at such fairly regular intervals as to exercise a continuous, beneficial effect on it, and should be graded by its condition rather than by the temperature.

FOREIGN NEWS AND ABSTRACTS.

EDITED BY AMÉDÉE GRANGER, M. D.

Recent Successes in the Intrarectal Radiotherapy of Prostatic Hypertrophy.

Moskowicz reports actually six new and recent observations made on patients suffering with prostatic hypertrophy and forced for a long time to subject to catheterization, and on whom he employed intrarectal applications of the X-rays. Only one of these patients derived no benefit from the treat-

ment; spontaneous micturition was restored more or less completely in the other five. Radiotherapy seems therefore to constitute a real resource for these patients, and it is rendered still more precious by the fact that it promises to replace prostatectomy, a serious operation, and which after the failure of relief from castration, remained until the present time our only and supreme means of treating advanced cases of prostatic hypertrophy.—Archives d'Electricité Médicale, March 25, 1906.

The Radio-Therapeutic Treatment of Epitheliomas in the Service of Professor Gaucher.

Drs. Gaston and Decrossas reported 57 cases of epitheliomas. Of this number 33 were of the face, 5 of the breast, 3 of the hand. The mucous and muco-cutaneous surfaces were involved as follows: upper lip, 2; lower lip, 3; commissure of lip, 2; tongue, 5; vulva, 2; penis, 2. Of these 57 cases, 23 were cured (40 per cent), 4 greatly improved, 9 made worse, 4 recurred, and the result in the remaining 13 is not known.

In a general way all the surface growths, irrespective of their situation, got well; the same was not true of the cancers of the lower lip, of the tongue, and of the glans penis, which in nearly every instance were made worse. Lastly, in two cases the radio-therapy caused after the first séance either a ganglionic involvement, or after the cure a recurrence in the glands. Four recurrences were noted in cases which had been discharged as cured.

In nearly one-half of the patients a mild radio-dermatitis was noticed. The cases that were made worse were intolerant to the action of the rays from the beginning of the treatment.

In the majority of these cases the treatments were made at short intervals. The anti-cathode was placed at a distance of 15 to 20 centimeters from the lesion, and an equivalent spark-gap, averaging 4-7 centimeters long, used. In general about 5 H was administered during each séance, in the beginning; later 2-3 H; depending upon the cases, the duration of the applications was from 10 to 45 minutes. The source of the rays was a 50-centimeter coil, used on the 110-volt D. C. with a Contremoulin-Gaiffe interrupter. (Archives d'Electricité Médicale, 10 Juin, 1906.)

Treatment of Fibroids of the Uterus by Faradization. By Dr. E. Witte.

The author employed the following technic, viz.; "We employ a uterine sound with its lower 7 centimeters insulated, and provided with a small transverse piece which prevents the instrument from penetrating into the uterine cavity beyond a certain point; the indifferent electrode is placed upon the abdomen. The applications are made daily for from 20 to 30 min-

utes with a progressively increasing current strength, but never going to the point where they would become painful."

During the two years that Dr. Witte has employed this technic, he has had neither complication nor accident occur which would necessitate an interruption in the treatment. The contractions of the uterus analogous to the pains of parturition, which follow an intense faradization cause suppression of the bloody flow, arrest the growth of the fibroid and bring about a retrogression amounting in several cases to a total disappearance of the growth, the organ returning to its normal size. (*Revue Internationale d'Electrotherapie*, Decembre, 1904.)

BOOK REVIEWS.

THE INFLUENCE OF THE MIND ON THE BODY. By DR. PAUL DUBOIS, translated by L. B. GALLATIN. 12mo, cloth, 50 cents net; by mail 54 cents. Published by Funk & Wagnalls Co., London and New York.

The writer of this little volume treats of the intimate relation which exists between the mind and the body. The author considers the brain, its deformities and varying types of development and their relation to the intelligence of the individual. He also treats of the individual traits commencing with childhood concerning the intellectual and moral heritage physical in its issues. We are not born criminals, poets, physicists, or scientists, but with a brain more or less well organized. He estimates in all therapeutic requirements "a twofold agency—physical and mental." The writer says: "There are no imaginary sick people." They all have either mental if not physical ills. In these in which there is no physical trouble, only the psychical—the mind requires appropriate treatment. The work is written in a clear and comprehensive style, and the subject considered from a rational scientific point of view, and is well worth the perusal of both physician and layman.

A COMPEND OF OPERATIVE GYNECOLOGY. Based on Lectures in the Course of Operative Gynecology on the Cadaver at the New York Post-Graduate Medical School and Hospital, delivered by WILLIAM SEAMAN BAINBRIDGE, M. D., Adjunct Professor of Operative Gynecology on the Cadaver, New York Post-Graduate Medical School and Hospital; Consulting Gynecologist, St. Mary's Hospital, Jamaica, L. I.; Consulting Gynecologist to St. Andrew's Convalescent Hospital, New York, etc. Compiled, with Additional Notes, in Collaboration with Harold D. Meeker, M. D., Instructor in Operative Gynecology on the Cadaver, New York Post-Graduate School and Hospital; Assistant Department of Gynecology, Vanderbilt Clinic, College of Physicians and Surgeons, New York. 12mo, cloth, 76 pages. Price, \$1.00 net. The Grafton Press, Publishers, New York City.

This little volume is written as a reference book for the busy practitioner, and an aid to the post-graduate or other medical student. It considers all of the operative procedures by modern gynecologists. The work, for a volume of its size, is very comprehensive and complete, and from the surgical point of view, all that could be desired. The work is thoroughly prac-

tical and up-to-date, and is cordially recommended to those desiring a work of its kind.

PROGRESSIVE MEDICINE. Volume VIII., No. 2. A Quarterly Digest of Advances, Discoveries, and Improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARR, M. D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College, Philadelphia, assisted by H. R. M. Landis M. D., Assistant Physician to the Out-Patient Medical Department of the Jefferson Medical College Hospital. June 1, 1906. Lea Brothers & Co., Philadelphia and New York. Six dollars per annum.

This volume contains valuable articles on Hernia, by Wm. B. Coley, M. D.; Surgery of the Abdomen Exclusive of Hernia, by Elwin Milton Foote, M. D.; Gynecology, by John G. Clarke, M. D.; Diseases of the Spleen, Thyroid Gland, and Lymphatic System, by Alfred Stengel, M. D.; and Ophthalmology, by Edward Jackson, M. D.

The chapter devoted to the treatment of Hernia, from the pen of the well-known authority on the subject, contains very much that is valuable, particularly on the subject of the radical cure.

The chapter on Abdominal Surgery touches briefly on various topics, including the Treatment of Paralyzed Intestine, the Prevention of Gauze Drains from Becoming Fixed in Granulations, Stomach Conditions, including Gastric Ulcer, the Treatment of Gastric Hemorrhage and Perforating Ulcers. The subject is well treated from the surgical point of view, and like the previous chapter, is well illustrated.

The chapter on Gynecology devotes a great deal of space to the consideration of Carcinoma of the Uterus. Conditions of the myometrium are considered at length. Curettage receives its share of recognition. In the closing part of the chapter a paragraph is devoted to the use of oil of cloves for sterilizing the hands, consideration of Diseases of the Blood, etc. The Development of the Methods of Investigation and Treatment are well Considered, as are also the Consideration of the Glandular and Lymphatic systems. In the chapter on Ophthalmology the various conditions are considered; in the closing paragraph attention is called to the Value of High Frequency Currents in the treatment of non-toxic amblyopia.

The volume contains an unusual amount of valuable information.

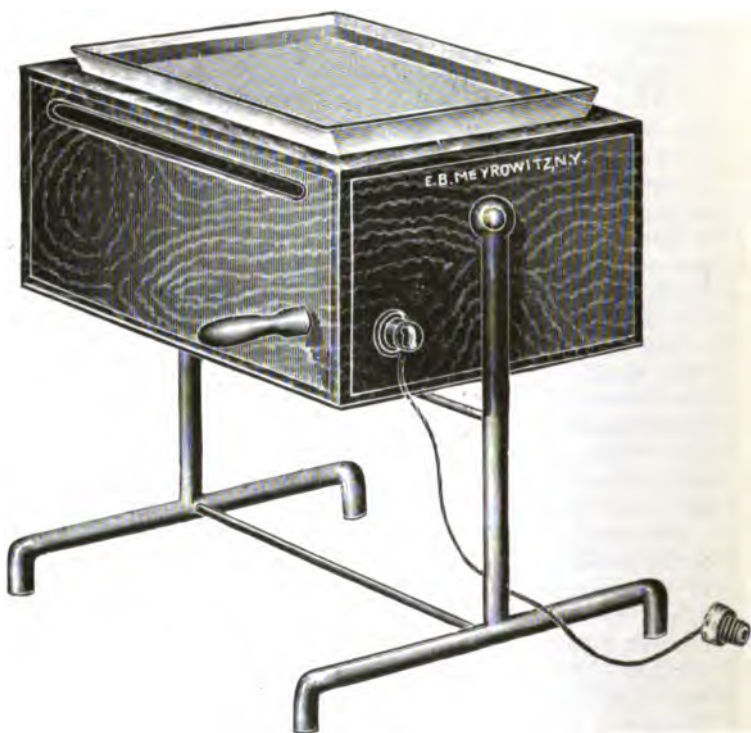
NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

COMBINATION ROCKER DEVELOPING TABLE AND ILLUMINATING BOX.

It consists of a ventilated box containing a set of incandescent lamps with switch and dimming rheostat. This box is made

to swing in a metal frame and can be actuated by an electric motor, foot, or hand power. In the top of the box are placed red and orange windows for cutting out the actinic rays from the lamps, so that the plate is not fogged or otherwise affected. Above these is the glass tray for the developing solution. In carrying on the developing, the light may remain on, can be



shut off, or turned down at will. With this arrangement frequent observations can be made during the process of developing, without removing the plate, thus being able to determine the proper time to remove said plate from solution. It has therefore, numerous advantages, the principal ones of which are:

- (1) Observations can be made under the most favorable conditions.
- (2) It provides an agitating device which is easy to manipulate.
- (3) It can be used as an illuminating box.

This apparatus is manufactured, and patents controlled, by E. B. Meyrowitz of New York City.

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THE PAST, PRESENT, AND FUTURE OF PHYSICAL THERAPEUTICS.*

BY WILLIAM BENHAM SNOW, M. D., NEW YORK.

From the earliest times of which we have any record diet, exercise, massage, heat, light, bathing, and later cupping, and other mechanical procedures were employed; but empirically then not as now in the light of a more perfect knowledge of histology, pathology, and their physiological effect upon the tissues of the body. The value of hydrotherapy or the action of light, heat, and electricity could not have been fully appreciated before the days of Harvey, nor the effects of these agents upon germs before Pasteur's time, before the recognition of the numerous microscopic organisms which infest the human body, or until the more recent knowledge of the action of the leucocytes which war against the infectious elements.

It is the better knowledge of the various functions of the human organism and the demonstration of the causes of disease, that have made possible the development of rational therapeutics. The past is history, and full of vagary and superstition, and though there were men in all ages who were earnest investigators, ignorance, like a pall, darkened the vision, shutting out the true relations of cause and effect in therapeutics until research revealed important truths. In most cases, administrations of which little was known were made for the relief of conditions the character of which much less was known. *Post hoc, propter hoc*, has in proper terms expressed the doubtful efficacy of the things of which little was known.

From the earliest times to the present day experimental medicine has been the bane of both physician and patient, and in practice to-day, particularly in the use of drugs, views and methods are diverse. Less now than in the olden time, be-

* Presidential address delivered at the Sixteenth Annual Meeting of the American Electro-Therapeutic Association at Philadelphia, September 18, 1906.

cause the better knowledge of pathology and more accurate methods of diagnosis, have rendered more definite the lines of indication.

Advanced knowledge of diseased conditions has not only made possible the employment of definite mechanical or chemical measures for the relief of local and constitutional derangements; but has created a demand as well for more exact and rational methods.

Chemical agencies under favorable conditions may induce mechanical effects, capable at times of relieving physical conditions, but in numerous instances, coincidentally induce subsequent injurious effects. The recognition of this fact leads the observing, as years advance, to abandon many of the drugs which in his youthful career he had considered as standards of the pharmacopœia. No truth is more pregnant in the minds of the members of the profession, than that the physician as he grows older employs less and less the doubtful, though unfortunately recognized, preparations of the pharmacopœia, and seeks other means of combating disease. The resourceful man and conscientious student under these conditions, seeks rational measures and such he finds in physical therapeutics. Too often, however, the busy practitioner devotes little time to the investigation of the more definite therapeutic measures; and they are, therefore, often neglected.

The luring field of surgery with its bountiful remuneration and positive results—either relieving suffering by restoring, dismembering, or sacrificing the life of the individual in the attempt—attracts where drug medications have been discouraging, and another extreme arises—to cure by surgery. Great is the triumph of modern surgery, but in the light of the great possibilities of other more safe and equally effective means in many cases, which do not dismember, or destroy, the use of the knife is certain to be curtailed in the future.

Physical agents in the hands of those trained in their employment, will fill the most important field in future therapeutics. In their employment, as much depends upon the skill of the operator to obtain the best results, as upon the skill of the surgeon who holds the knife—a fact too often disregarded.

The various so-called therapies should no longer be ranked as specialties. The study of the relative merits of them all calls on each to fill a definite field in the future, but they must

be employed in an effective manner, as indicated in the various conditions as they arise. The physician who has best command of them all, will best serve his patient.

Colombo and others have shown that there are few cases that do not require more than one modality or measure to combat the symptoms complex as they occur in most cases. Those who confine themselves to the use of drugs, surgery, electrotherapy, phototherapy, mechanotherapy, or any other means or method are certain to neglect to a degree the means of meeting effectively all of the indications as present in most cases. The call is for a broad-gauge, honest investigating spirit, with a willingness to adopt all that is good, and a determination to weed out the spurious and dangerous in therapeutics.

The indifference of the uninformed who either attempt to prejudice others or assume to make use alone of means with which they are familiar, now, in the light of their demonstrated value, is to be deplored. We find the evidence of this in the autocratic position of surgeons who attempt to cure organic affections with the knife. So also is the disposition of some who adhere too exclusively to the employment of electricity, mechanical vibration, or massage, to the exclusion of the others, or of surgery, or often indicated drugs of the pharmacopœia. The osteopath and others outside of the profession, who attempt to employ them, also bring discredit on physical measures.

The number of the profession who have made honest, conscientious study of electricity, radiant energy, heat and cold, exercise, mechanical vibration, and other mechanical measures, and have a fair conception of their value in therapeutics is relatively small. Advanced knowledge of these means, however, in the hands of those who do understand them, has added virility to therapeutics, when such as Osler have learned to look upon that department of our science as little less than impotent.

In the treatment of disease there are cardinal indications which include: (1) prevention by removal of the cause—prophylactic therapeutics which include regulation of habit and diet; (2) removal of infectious germs and their effects—toxemia and congestion; (3) removal of the effects of trauma, local stasis as it presents itself in the region of simple inflam-

mation, associated with varying degrees of infiltration; (4) establishment of general activity when torpor or functional irregularities are present.

It will be readily observed that these indications are best conserved by measures which facilitate restoration without adding to the dangers of the conditions. The restoration of unimpaired functional activity is health. Regulated exercise, healthy environment, moral and physical, and a proper diet, are prerequisites. Given these, which are essential to health, and it but remains to remove causes of conditions which are found present to effect the cure. Failing in this, to cure is impossible.

It is a well-recognized fact that disease is generally associated with an inflammatory process either infected, or non-infected. Considering therapeutics from this point of view, the modalities or means indicated may be divided into those which relieve the stasis of simple localized inflammation and promote elimination of the products of inflammation from the tissues involved, and those from which it is necessary to first remove the infecting germs which are the exciting cause of the inflammatory process.

The therapeutics of the simple non-infected inflammatory conditions, when it is apparent that such lesions result from some irritant other than infection, as trauma or sequelæ of a protracted hyperæmic conditions resulting in a chronic process, must depend upon the restoration to normal of a circumscribed region of local stasis. When we realize that the inertia thus present in the tissues is well established, and a chronic condition for which nature has provided no immediate means of relief, the indication is apparent—its removal.

Who would now presume by medicinal remedies to overcome local stasis? and yet drugs are commonly administered to accomplish this result. No other than a mechanical measure, one which is capable of relieving the stagnation, would be contemplated by the rational physician. To remove the indurated area, and re-establish circulation and activity in the tissues which are the seat of the trouble, are the indications to be met in every case of non-infected simple inflammation. The measures that can be relied upon to meet these indications will vary with the location of the patient (whether the best means are at hand), and location of the lesion or the tissue involved.

Applications of heat and cold, dry or moist, at the bedside, persisted in for hours are capable in early non-infected superficial inflammatory conditions of relieving the induration, and re-establishing circulation. At the office other measures better meet the requirements. The application of radiant light and heat is not to be included as heat administrations only; for combined they include the action of both. Prolonged heat applications constrict the tissues, force out fluid, and thus overcome the induration of local stasis.

Radiant light and heat produce, when administrations are sufficiently prolonged, a degree of superficial hyperemia which by dilating the capillaries and arterioles, facilitates the restoration of superficial circulation, that when maintained for a necessary length of time is sufficient to relieve regions of stasis superficially by restoring circulatory activity.

The incautious administration of mechanical vibration and massage to inflamed tissues is contraindicated, for though they may temporarily relieve stasis, in unskilled hands they macerate and irritate the tissues thereby inducing a return of the condition for the relief of which they were employed, for stasis is first induced by extreme local irritation, and a measure which may add irritation must be employed with caution. Radiant light and heat produce these effects by their intrinsic actions on the tissues themselves. By their effect upon the reflex mechanism they produce softening and drainage of the indurated area, re-establishing circulation and coincidentally restoring the nutritive processes. This form of radiant energy, however, is most applicable to the early stages of an inflammatory process, the later conditions failing to yield to the administrations. To satisfactorily meet chronic and deeper-seated indurated conditions, the high potential static modalities surpass all other means because they are capable of inducing successive contraction and relaxation of the mass which they comprise, in a manner capable of conveying this effect into deeply-seated structures, which becoming intrinsically active, induce the evacuation of the infiltrate,—the products of the inflammatory process. This done, in acute, non-infected conditions restoration is immediate, except when tissues have been ruptured or fractured, when they hasten repair by keeping down the induration which always cuts off nutrition from the tissues involved. It matters not except of the brain, which is

inaccessible, where the inflammatory process is located—in the spinal cord, glandular, motor, or sexual apparatus, the result following the effectual removal of local stasis results in the prompt recovery of all early lesions and the rapid improvement and final recovery of chronic conditions in which a marked degree of degeneration has not impaired the local nutritive and eliminative functions, which is rarely the case within two years, except in cord lesions in which the destructive processes are rapid. Early treatment of anterior poliomyelitis, and of tabes dorsalis in the first stage is generally successful.

Under the classification of *non-infected inflammatory conditions* are arrayed a long list of so-called chronic diseases or conditions which are certain of *becoming* chronic unless the inflammatory process is abated by some other than natural processes—the forms of neuritis, glandular enlargements, including congestions of the abdominal viscera, uterine and ovarian congestions, uterine subinvolution and prostatitis; the various inflammatory non-septic joint affections the result of trauma or impaired metabolism, including rheumatoid arthritis and all other uncomplicated cases of synovitis or sprains of the motor apparatus.

Under the classification of infected inflammatory processes are included conditions requiring quite another routine of treatment; and with these as with the non-infected, the physical agents best meet the indications. Local suppurative processes in their early stages are promptly aborted by the same means and methods employed in relieving stasis in the simple inflammatory conditions. Within the first thirty-six hours, the element of infection is relatively so insignificant, that with the increased vascularity and leucocytosis in the region of the lesion there is no danger of extending the infection by removal of the induration. On the contrary, rapid destruction of the infecting germs by the leucocytes takes place and an otherwise painful process is terminated. These measures are particularly applicable in the early stages of boils, felons, carbuncles, and suppurative tonsilitis. In these the application of radiant light and heat or dry or moist heat, or best of all the vacuum tube connected directly with the static machine, employing otherwise the same connections as with the static wave-current, promptly relieves the pain and congestion, and terminates the process.

In the more grave and deeply seated infected processes, in local or general septicemia, the administration of dry hot air, at temperatures ranging from 300° to 400° F., is capable of increasing the number and activity of the leucocytes and at the same time of lowering the vitality of the pathogenic microorganisms. Under its judicious use local septicemia can always be terminated, and the results of general septicemia are remarkably successful. If there were no other indications for the employment of dry hot air than for the treatment of these conditions, its great value as a therapeutic measure would be established. In addition, however, the active diaphoresis induced eliminates the toxins, increases superficial metabolism, and stimulates reflexly the activities of the deep sympathetic and spinal centers. Whether the high-power localizing lamp and incandescent-light bath of great intensity do not accomplish even more than dry hot air is a question for serious consideration.

The effects of light to increase metabolism and excretion, and reflexly to stimulate the deep sympathetic and spinal centers are remarkable. The actinic action of light upon the circulating blood as it passes through the dilated capillaries during prolonged exposures is effective in removing to a degree the products of infection and inhibiting the activity of most germs present, destroying others, and at the same time increasing the general activity of the leucocytes.

A matter of therapeutic interest in the administrations of light to be determined is the relative intensity necessary to penetrate to certain depths and the intensity and duration essential to affect the pathogenic bacteria. Unquestionably, the greater the intensity and volume of the source, the greater the degree of penetration. For this reason, the concentrated light from a powerful electric arc as the marine searchlight, or the incandescent light from lamps of high candle power, that can be moved about, exposing the surface interruptedly to periods of radiation of great intensity, is productive of best results in the treatment of local inflammatory and infectious processes, and the field of application for these measures is very large, the indications for their employment being easily recognized. The results uniformly obtained from their use in the treatment of local inflammatory conditions, particularly of an infectious nature, indicate their general employment as a routine measure

in all such conditions, except in cases in which the X-ray or electricity is particularly indicated.

The Roentgen ray fills a most important place in the treatment of infectious conditions. The experiments of our esteemed associate Dr. Edward C. Titus, presented before this association one year ago, and verified in the writer's experience during the past year, as well as the investigations of Dr. Tilden Brown, which demonstrated the sterilizing effect of the X-ray upon man, have placed this modality in a unique field in therapeutics. It seems possible that it is to be demonstrated that the inhibitory effects of this form of radiant energy may destroy the virility of every living thing. Results obtained during the past year in the treatment of carbuncles and boils have verified the previous experience of the host of observers with acne vulgaris. The effects also upon tubercular processes include this germ in the category of those affected by the X-ray. It is well demonstrated that this form of radiation does not destroy the normal tissue elements when extreme degrees of inhibition of tissue activity are not produced by too many or too long exposures. After the first and second periods of administration the skin invariably returns to normal tone, vigor, and function. During periods of inhibition, abnormal elements disappear, and keloid and fibrous bands of adventitious tissues are absorbed. Germs, fungoids and other parasitic organisms perish and disappear. This is accomplished by rendering the skin non-sustaining to such forms of life, and undoubtedly in many if not in all cases by sterilizing the lower forms of life as well, and thereby preventing their proliferation. This fact having been demonstrated in many species, it is hopeful that such an effect may be shown to include all forms of life, for it is now recognized and demonstrated that radiant light and heat is an effectual if not a complete antithesis of the Roentgen ray, and that we are able to rapidly restore the functions of parts, not too deeply situated, to normal by its counter-applications. Under these conditions in the hands of the judicious operator who understands the limitations, efficiency, and relation of these measures, it is hopeful that a great number of hitherto incurable conditions may be mastered by the searching influences of an agent so potent.

In the treatment of infectious conditions the high potential electrical discharges are not less energetic or valuable than the

others. Administered with glass vacuum tubes in which the ever active negative electrons induce radiations the actinic effects of which seem to equal if not surpass the higher frequencies of the solar spectrum, we are enabled to superficially affect the blood in tissues rendered hyperemic by the discharges as we do by light. Added to these actinic influences of the discharges the sterilizing and antiseptic influences of the nitrous acid and ozone evolved whenever an electrode is in contact with the tissues. While the cataphoric influences of the drugs administered in this manner with these electrodes may be possible, it is probable that the action upon specific organisms is more marked from the electrical discharges, than from the drugs administered in this manner. Unquestionably the employment of any agent which increases local hyperemia in an affected region by calling more blood to the tissues increases their resistance, and the presence of a larger number of phagocytes, thereby hastening the destruction of infecting elements present in the tissues which they are capable of destroying.

The effects of the physical agents are invaluable in restoring metabolism and nutritive processes and removing contractures by producing general functional activities in persons of sedentary habits, or those who have permitted by irregularities or excesses some part of their organism to become inactive with functions impaired. The rational physical agents which overcome inertia and induce activities, instead of drugs, are indicated in these conditions. The more energetic and forceful procedures are here to be employed, as active exercise, mechanical vibration, and the profound vibratory influences induced by the static modalities which set the tissues into energetic vibratory action, inducing active tissue gymnastics and exercise in inactive viscera, thereby overcoming localized regions of hyperemia and atony, and restoring function to the parts. Added to this the influences upon superficial general metabolism and activity in the skin, by employment of the varying degrees of heat and cold by means of hydrotherapy in the various manners, use of the light bath and localized light, and dry heat and spinal vibration, one or more of them, the most rational and effective régime is established.

These general references to the potent influences of physical measures are sufficient to suggest their very large range of indication and their inestimable value in therapeutics. It is

the duty now of every one who is conversant with any or all of these valuable measures to use his best energies in disseminating the knowledge and by judicious, temperate means, bring the fellows of our profession who are still in ignorance or doubt to recognize the importance of accepting and adopting these physical measures for humanity's sake. To this end, the time is ripe for an organized effort in one or more of the great clinical centers of our country for the establishment of a great institution which shall have for its object the investigation and dissemination of the great truths pregnant in physical therapeutics. Such institution should be under the superintendence of unbiased members of the profession, and a board of censors representing all departments of the profession, who will thoroughly examine the clinical results and report to the fraternity at large the value or worthlessness of the numerous physical and pharmaceutical measures which are being urged upon the profession and to which the susceptible and unreflecting turn in their despair.

The time has come and the rights of humanity demand at the hands of the great profession to whose care their lives are trusted, to put forth their best endeavors and adopt only the best measures, eliminating useless remedies, for the relief of suffering and disease. Not only the physical measures but all therapeutical and surgical procedures should be judiciously investigated and professional bias and personal motives and interests be forever removed from consideration by our great profession and the results of investigation be given wide publicity. An institution of this sort would forever eliminate the prejudice of pathies, overthrow the infamy of quackery, and place the profession upon a dignified basis which would make it obligatory upon our legislators and the public to recognize only as valuable what passes the censorship of a properly constituted judicial body. Under wise supervision the good and true and valuable in therapeutics would be recognized, and all possibility of narrowness and exclusiveness in the various departments of our science be forever eliminated.

349 West Fifty-Seventh Street.

THE ACTION OF ROENTGEN RAYS UPON THE NERVOUS SYSTEM.*

BY PROF. CARLO COLOMBO, ROME, ITALY,

Professor of Physical Therapeutics in the Royal University of Rome, Manager of the Central Institute of Physical Therapy.

Many radiologists, from the very first days of Roentgenology, have remarked the nervous disturbances occasioned by the radiation from the Crookes tube, and they have attributed the cause of such phenomena—as of many others whose nature at the time was unknown—to most dissimilar agencies. Some traced them to the oscillating Herzian field that radiates from the Crookes tube especially when hard; others to the fluorescent cathodic rays that come through the walls of the tube; others to the specific action of the Roentgen rays properly so called; others, finally, to extraneous causes, as the uncomfortable position of the patient during the radiographic poses, which at that time were very long.

The phenomena were nausea, headaches, delirium at night, cramps, anesthesia, abortion, and sometimes paresis and paralysis of the limbs occurring when patients had been long exposed to the X-rays.

Confronted with phenomena of such gravity, scientists sought an explanation from experiment, and many animals were sacrificed to this end.

Rodet and Bertin Sano were able to provoke cramps, paralysis, and death in fourteen days, in the case of little animals exposed to the X-rays. Examining them after death they found meningo-myelitic alterations through all the regions of the cord irradiated, also cellular hyperplasia and even some little hemorrhagic foci. This meningo-myelitis was certainly not of septic origin, because the bacteriological examination of the blood, of the cephalo-rachidian liquid and of the marrow gave a negative result.

Futassy has reported cases of paresis of the extremities followed by death, in small guinea pigs and rabbits that he had subjected to Roentgen irradiation. Oudin, Barthelemy, Darier, and Ogus have also noted cases of paraplegia in small animals.

* Read before the Sixth Annual Meeting of the Roentgen Ray Society, at Niagara Falls, August 30, 1906.

Kienbock found analogous phenomena in the case of rats, but he did not get the same results with guinea pigs.

Scholtz, too, in one case observed paralysis in a rabbit exposed to the X-ray.

Ficinsky, in the case of guinea pigs, found degeneration of the lateral cordons and of the gray substance of the posterior cornua of the cord.

Finally Danysz found lesions of the nervous system in animals, not exposed to the Roentgen rays, but to radioactive substances.

On the basis of these experiments new observations were made on human beings. Out of the large number of these I wish to refer to the following case of Bertolotti, which is very conclusive, as it has an analogy with the one I wish to report. It is the case of a man affected with *ulcus rodens* of the right fronto-parietal region, who even before signs of cutaneous reaction appeared, was seized suddenly with violent headache, nausea, vertigo, inequality of the pupil, and various symptoms of meningeal irritation, which passed away, but were repeated immediately upon the resumption of the radiotherapeutic treatment. Whence the writer concludes there was an active action of the X-rays upon the nervous center and upon the meninges, which was confirmed upon examination of the cephalo-rachidian liquid, on the subject of which the writer is specially qualified to judge. The active and immediate action of the Roentgen rays upon the nervous system being thus clearly proved, radiologists and doctors have attempted to utilize it beneficially in the cure of diseases of the nervous system.

The sedative action of the X-rays on the pain principle seems undeniable. Neuralgias and neuritis have been relieved and even cured with irradiations from Crookes' tube, by Pusey, Cederholm, Guilleminot, Weil, Bloch, Leonard, Gramegna; and with radium by Darier.

But it would seem we may even count upon a therapeutic action on the nervous centers themselves.

At the Salpêtrière Raymond says he cured two cases of syringo-myelia by irradiating the spinal marrow at the right place.

Pescarolo and Gramegna obtained the same result in two cases of syringo-myelia and in two intra-rachidian tumors.

Branth claims to have succeeded in cases of epilepsy, Beck

in Basedow's disease, and Raymond and Zimmer in spinal tabes.

The case I am about to adduce will show once more, I think, the action of the Roentgen rays upon the central nervous system, though taking place in a way a little different from that hitherto observed by the various writers on the subject.

Mrs. A. T., thirty-six years old, of Massa-Maritima, married, with three children. Nervous heritage in the family.

The patient showed all the stigmata of hysteria. As a young girl and a young woman she had frequent attacks of classic hysterical convulsions. Later on, although free from convulsive attacks, she was constantly in a state of some excitability of the nervous system.

On account of a sedentary life and bad abdominal circulation, a condition of marked varicosity of the lower limbs was developed, especially of the lower left leg. The member became dropsical, hard, and covered with large brown spots, and from this, after her last confinement, there developed an acute phlebitis, with high fever and with alarming painful phenomena. This happened in 1900. When the acute phlebitis was cured, there remained hard varicose growths, both superficial and deep-seated, and both in the venous and lymphatic systems, with infiltrations into all the tissues of the leg, cutaneous edema, pigmentation, and serious muscular denutrition, so that the patient walked as little as possible.

In this way the evil went on increasing and great varicose ulcers were formed in the inner anterior region of the left leg.

The ulcerations were very painful especially after medical treatment, of which she had attempted every variety in about five years; but the patient bore all her miseries with great resignation, and had no longer any hope as to the possibility of a cure.

All the same, following the advice of a surgeon, she agreed to have the varicose growths in different places removed, after which she seemed for the time to be cured; but after a few months the varicose growths re-formed both in the veins and in the lymphatics; the leg resumed its former appearance and a great ulcer formed on the inner front part of the left leg nearly level with the middle of the tibia, of irregular form, with transverse diameter 24 mms. and longitudinal diameter 40 mms. The bottom of the ulcer was hollow, granulous, and often bloody, with intentated sloping edges.

In this condition the patient consulted me; and I did not hesitate to recommend mild applications of massage and some appropriate active and passive kinesitherapeutic exercises, with a view to stimulate the venous and lymphatic circulation in this limb. I thought it would also be good to add some applications of Roentgen rays to exert a direct influence towards the healing of the ulcer and to calm the pain. The radiotherapy of varicose ulcers is now admitted by all the most eminent radiologists and dermatologists, and I myself had experienced in other cases its ready and indisputable efficacy.

The irradiation was localized only on the ulcerated cutaneous surface, all the healthy skin round it being protected by a localizer.

The apparatus I use for the production of Roentgen rays is one of the most perfect and consists of the following:

(a) A Gaiffe transformer with closed magnetic circuit (without interrupter) working by means of the alternate monophasic street current, of 102 volts and 43 periods or cycles.

(b) Two Villard valvules interposed in shunt in the circuit which separate the two alternating waves, letting only one pass into the tube, always in the same direction.

(c) A Beclère spintermeter inserted in the circuit to indicate the length of the spark-gap and, through it, the degree of hardness of the tube.

(d) A special milliamperemeter, to measure the intensity of the secondary current that traverses the tube, permitting us, in some degree, to control the emission of the tube itself.

(e) A Chabaud tube with Villard osmoregulator, specially adapted for radiotherapy, through the small quantity of rays it emits and through the ease with which the degree of hardness is maintained constant.

(f) A Benoist radiochromometer, to estimate the degree of penetration of the rays emitted from the tube.

(g) A Labouraud-Noirè radiometer for the dosing of the quantity of X-rays absorbed by the part treated in each sitting.

(h) A Belot localizer, of the latest design, to localize the Roentgen action upon the diseased part alone, and to protect those parts of the body—neighboring or remote—not to be irradiated.

With such a device there is no possibility of any error in the

estimation, whether of the degree of penetration of the rays used or of the quantity of rays in each sitting projected upon the part under treatment: and we have the absolute certainty that the Roentgen rays have acted only and exactly within the limits antecedently assigned to them.

Our patient then was subjected to radiotherapeutic sittings by the fractional dose method.

It is well known that there is a group of radiologists, especially French, with Becière at their head, who hold the dose in mass to be the best method. To the part indicated they administer at once the largest dose of X-rays recognized as compatible with the integrity of the cutaneous tissues, and between one application and another, they leave a sufficient interval (a week) to prevent the accumulation of the successive doses.

But in the case before us, although there was no danger of injuring the skin, as it was already ulcerated, we had two reasons to prefer the fractional doses:

(1) The need of watching uninterruptedly the local and general reaction of the X-rays in so sensitive a patient, and daily to inspire her with confidence in the treatment, by means of a short sitting every day.

(2) The necessity of not exhausting a subject of little physical resistance by means of long and wearying sittings, and the desire to practice the sedative action of the X-rays upon ulcerated tissue, at brief intervals.

The patient was comfortably extended on the radiotherapeutic bed; and to the ulcerated skin we applied the cylindrical tube of the Belot localizer, No. 2, of 40 mms. diameter.

In this way the ulcerated surface was exactly contained within the circumference of the localizing tube, as was also a small extent of its margins in the longitudinal diameter; while the healthy skin included within the localizer in the transverse direction was protected by a suitable plate of lead introduced under the localizing tube. The length of the localizing tube was such that the distance of the bottom of the ulcer from the center of the anticathode of the Crookes tube was exactly 15 cms. The Crookes tube was every day regulated so that its hardness should constantly correspond with 6 degrees Benoist. The quantity of rays administered at every application corresponded to 2 units H, and the sittings were made at intervals of three days. When a total quantity of 12-13 units H was reached, there was a longer interval of rest.

Altogether 40 H were administered in fifty-eight days, which gives an average of about two-thirds H each day.

Considering, however, that the final effect of a dose of X-rays administered by fractions corresponds to the final effect of the dose in mass diminished by one-fourth (Belot), the total dose administered by us is reduced to an effective dose of 30 H, or to an average of one-half H per day. As is seen, it is a matter of very small doses, inferior to the average dose in ordinary use not for ulcerated skin but for whole tissues.

The treatment began on the 27th of February, 1906.

At the beginning the patient bore the treatment fairly well, and on March 13, 1906, that is after fifteen days' treatment, having received in five applications a quantity of X-rays corresponding to about 10 H, the ulcer was observed to be less deep, with its surface smoother, with less secretions, and with the edges on the way to healing.

The dimensions of the ulcer were reduced by not a little, the longitudinal diameter measuring 36 mms., and the transverse 21 mms. The edema of the leg was less pronounced, and the hard and deep-seated growths due to venous and lymphatic varicosity were giving way under the action of gentle massage and the passive and active exercise of the extremities. The treatment then proceeded with full satisfaction both to the doctor and the patient.

To avoid the possible too lively reactions at this point I ordered a longer interval of suspension of radiotherapy, continuing, however, the kinesitherapeutic treatment.

On March 20 the application of the Roentgen rays was recommenced, under the same conditions above described, the same doses of X-rays being administered and the same intervals of repose allowed.

On March 26, after two applications of radiotherapy, in which about 4 H were administered, the lady was seized with serious hysterical convulsions, which she had not had for a long time, and which were repeated for three consecutive nights accompanied by an indescribable condition of nervous agitation. The radiotherapeutic treatment was suspended and she was treated as her nervous symptoms suggested. The ulcer was treated with oxide of zinc paste and with sedatives.

On March 30, as the patient was restored, and we did not

think there could be any relation between the radiotherapeutic applications and the nervous manifestations, the X-ray sittings were resumed: but the following night she had still more violent convulsions.

There was a new suspension of the radiotherapy, during which we observed that the local conditions of the ulcer were further improving.

On April 4, the radiotherapeutic applications were resumed, under the conditions before described, but from that day she complained of severe pains radiating from the ulcer and traversing her whole body, producing in her a condition of extreme agitation and hindering her sleep. As I had faith, however, in the success of my treatment, I continued the applications until the 14th of April, on which day the ulcer measured 18 mms. along the transverse diameter, and 35 along the longitudinal. On April 29 the patient could no longer endure the burning and gnawing pain which extended from the ulcer all over her body, the nervous agitation that had mastered her, and the insomnia; and she definitely suspended the radiotherapy.

The nervous condition of the patient became continually worse; there were almost continuous convulsions, and absolute sleeplessness, and the patient writhed piteously upon her bed.

They spoke of shutting her up in an asylum, for there was reason to fear for her sanity, but all at once just this threat of confinement had a surprising and inspiring effect upon her, and the disquieting symptoms diminished gradually, and the patient could leave for her own town early in June, in moderate health.

Of the ulceration I have not been able to learn anything more, but it is probable it has continued healing.

The nervous phenomena from which our patient suffered appeared suddenly and without presumable cause other than the radiotherapeutic treatment. Further these disturbances manifestly followed a course parallel with the administration of the Roentgen rays, becoming weaker whenever the applications were suspended, and gradually assuming more serious proportions with the accumulation of the successive doses of X-rays.

For these reasons we may consider that the cause of the

disturbances of the central nervous system in our patient was the radiotherapeutic application. But at this point we ask ourselves: Was the radiotherapy in this case only an occasional cause or a true determining cause, the only and immediate beginning of the disturbances?

As we have already shown, various writers have proved that the Roentgen rays, applied directly to the spinal cord or to the brain of animals or man, produce indisputable functional and anatomical alterations even without the cutaneous surface crossed by the rays being affected. But all these authors have irradiated the nervous centers directly and the action obtained by them is reasonable and perfectly to be explained. On the contrary, in our case the Roentgenian irradiation was directed upon a part very remote from the nervous centers and localized in a very small tract of the cutaneous surface.

How then could the action of the X-rays make itself felt in the nervous centers, even as far as the brain?

Here we are met by an earlier hypothesis, based upon Kienbock's theory, according to which similar general disturbances of the organism accompanied sometimes by fever, headache, delirium, etc., would be due to the absorption of toxin produced by the Roentgenian action upon the cellular elements of the ulceration.

But such an interpretation is not in this case admissible, because in our case there was no fever, and because the extension of the cutaneous lesion was so extremely limited as to render it improbable that it could produce the quantity of toxin necessary to occasion such serious phenomena.

Then in our case no other explanation remains except the following: namely, that the X-rays, though acting locally upon the ulcer, also indirectly gave stimulus—through the medium of the sensitive nerve terminations—that extended as far as the spinal marrow and the cerebral vortex, which already constituted the points of least resistance in a neuropathic individual.

So the action of the Roentgen rays was only an occasional cause, producing the outbreak—by reflex action—of the nervous phenomena to which the patient was already predisposed by the constitutional weakness of her nervous centers.

THE DIAGNOSIS AND TREATMENT OF RHEUMATISM AND ALLIED AFFECTIONS.

BY ALBERT C. GEYSER, M. D., NEW YORK.

Clinical Instructor in Radiography and Radiotherapy at Cornell University Medical College; Member American Medical Association, American Electro-Therapeutic Association, New York State Medical Association, Harlem Medical Association, Medical Society of the Borough of the Bronx, Medical Society of Greater New York, Manhattan Dermatological Society, etc.

(Continued from page 464.)

How to Find Painful Centers.—For this purpose, the patient's back is bared, a high-tension faradic coil is brought into use. Before applying this current, the coil should be tested with a four- to six-inch Geissler tube. If the coil is capable of illuminating the tube, then it possesses the proper amount of penetrative power to be useful for our purpose. The Kidder Manufacturing Co., of New York, wind their coils in a new and novel manner, making them especially fit for diagnostic work.

One pole of the battery—it does not appear to make any difference which—is attached to a six by six inches moist electrode, and applied in front over the epigastric plexus, the other, or smaller electrode, two by two inches, well moistened, is passed lightly over the spinal column, with a current strength sufficient to be agreeably susceptible. Pass this current up and down the entire length of the spinal column with ordinary pressure, three to five times, and remove the electrodes, when to our agreeable surprise we have boldly outlined upon an otherwise white background vivid red spots. These spots for some few minutes after the current is removed tend to become even more prominent and more sharply circumscribed. If we now make digital pressure upon any of these indicated points, we will find sensitive or painful areas, while no pain will be complained of in the intermediate region.

These pictures in a short time become almost pathognomonic of certain ailments, so that the observer can almost make a diagnosis from the reflex centers involved. The explanation of this phenomenon is neither mysterious nor difficult if we remember the nerve connection just prior to entrance or exit of the spinal canal; and if we bear in mind the effect of irritation

upon any tissue, then we have a clear conception of why the sympathetic nervous system should respond so readily to irritation, and why the more irritated centers (from other causes) should respond before even the normal tissue appreciates the irritation produced by the current.

Having by this or any other manner or method, located the reflex centers involved, it next becomes our duty to ascertain whether the distal tissue or organ involved is in a hyperemic or anemic condition. When somewhere in the body an organ or tissue is found to be swollen, and in a state of chronic congestion, the sympathetic center should be so influenced that the vascular supply will be limited. This can be accomplished by several methods: (1) by application of heat, counter-irritants, actual or galvano-cautery; (2) by the continuous current—since the passage of a weak current so stimulates these centers as to cause a contraction of the blood vessels supplying the part; (3) by the static brush-discharge; (4) by mechanical vibration lightly and superficially applied; (5) by gentle massage applied to the tender spots, and (6) the application of the "light treatment," especially the red rays.

If, on the other hand, it is found that the condition is one of anemia, it will require just the opposite treatment: (1) by the application of cold water, ice-bags, or various evaporating lotions, or actual freezing with ethyl chloride; (2) the passage of a current from a high-tension faradic current; (3) static sparks, or the static wave-current; (4) mechanical vibration with deep pressure and short stroke; (5) heavy massage applied deeply in the interspaces; (6) the application of the "light treatment," especially the blue or ultra-violet. All these applications have the effect of causing the reflex centers governing the particular area to inhibit the vasomotor nerves, and cause a dilatation of the blood vessels with increased supply of nutrient material.

When the sympathetic is cut in the neck, as previously stated, there results an increase in the blood supply upon the side of the head corresponding to the severed nerve. In other words, the cells which govern the action of its fiber are no longer exercising that function. This effect can be brought about by the application of cold over the particular center; when contraction of the cell takes place, the normal blood supply is interfered with, and to all intents and purposes the cell no

longer controls the action of its fibers. Relaxation then takes place with the consequent increase in the local blood supply. On the other hand, if heat is placed over the reflex center an extra supply of blood invades the nerve cell, it performs its function with especial vigor and contraction of the blood vessels takes place at the distal end of the nerve, thereby causing a local anemia. If, for example, one of the lower extremities is congested, heated, and painful, or in another case the lower extremities are flaccid, cold, and numb, in which cases the pathological conditions of blood supply are diametrically opposed to each other, and a therapeutic measure be employed in either the reverse from that which is indicated, the local condition in both cases will be made worse. The particular method employed, be it the spinal ice-bag, or the hot-water bottle to spine, or any other therapeutic measure improperly employed would be condemned and sink unjustly into oblivion, without the operator perhaps ever knowing the reason for his failure. From the other point of view, when the operator intelligently employs the proper measure, a glorious result is obtained. The operator who proceeds without an intelligent knowledge of indication meets his Waterloo, and never knows why he in the one case succeeds, in another fails. The ever increasing number of remedies is a sure sign that we should treat our patients first, their diseases after.

Rheumatism is the type of disease under consideration, but the system of diagnosis referred to applies practically to all diseases, but more especially to those conditions which we have erroneously learned to look upon as chronic diseases, when in reality they are symptoms of some underlying or undiscovered lesion, from which the patient has never recovered, though the symptoms from time to time have changed.

The following cases will serve to show the practical application of the method:

CASE I.—Miss J., aged nineteen, living upon a farm on Long Island, for the past eleven years has had epileptic seizures, averaging five per week; has been treated principally with the bromides. Her appetite is good, menstruation regular, and is well in every other respect. Her memory has been failing and she cannot concentrate her mind upon anything very long. Spinal examination revealed a decided reaction between the fourth and fifth cervical and first and second dorsal vertebræ.

These two constitute the reflex centers for the dilatation and contraction of the pupils. My diagnosis was astigmatism in one or both eyes, causing a reflex irritation, resulting in epileptic seizures. She was sent to Dr. Skeel, the proper glasses were prescribed, and in addition she was ordered to take a rectal douche consisting of two quarts of warm soap water every morning upon arising; at least twice weekly a very hot and prolonged bath at night; to drink large amounts of water and to take plenty of active exercise in the open air. Her epileptic attacks ceased within three weeks. She had her last attack in January, 1905, and is bright and cheerful, has gained in weight, and is apparently cured.

CASE II.—Mr. F., aged forty-six, merchant tailor, referred by Dr. Starke latter part of 1903, suffering from so-called rheumatic sciatica. He had had a number of previous attacks of rheumatic pain, but never so severe nor localized in one nerve. He had been taking morphine injections each night for a week to obtain sleep. Spinal examination revealed a reaction between first and fourth lumbar vertebræ, which is the reflex or sympathetic center for the colon; upon further examination the diagnosis of auto-toxemia was made. Treatment consisted in superficial vibration over these centers, deep vibration over the sciatic nerve at its point of emergence from great sacro-sciatic foramen, rectal douche of soap water every morning, abstinence from all food excepting raw fruit and the drinking of plenty of water. This régime was continued for ten days, the symptoms very gradually abated, he lost considerable in weight, in three weeks more he had regained his loss upon proper diet, he has been attending to his business ever since without any recurrence.

CASE III.—Miss H., aged eighteen, Mount Hope; referred by Dr. Skeel. Has always suffered slightly from malaria, with occasional attacks of shifting rheumatic pains in various joints, six months ago developed chorea of the upper extremities. Spinal examination showed a reaction between the eighth and twelfth dorsal with a referred pain under left shoulder blade, this last symptom is important as it confirms the diagnosis. Between the eighth and twelfth dorsal vertebræ are located a number of important centers, but whenever this region shows a reaction with a referred pain under the left shoulder blade we may take it for granted that the spleen is the principal organ

involved: that, with a history of malaria, indicated that the patient was suffering from a malarial toxemia. Treatment consisted of methylene blue gr. j and acid, arseniosi gr. 1-50, this dose to be taken three times daily. No animal food was permitted, the bowels to be kept open. The region between eighth and twelfth dorsal vertebræ was treated every other day with the high frequency current up to the point of producing a local anemia, the whole body exposed to the action of X-ray tube for fifteen minutes, which increases the production of leucocytes so that the general phagocytic action is augmented; after the sixth treatment the chorea had ceased entirely. In three more weeks the reaction on the spine failed to appear, this patient has been free from all sickness since 1903.

CASE IV.—Mr. C. O., age forty-two, captain of a fishing vessel, had had rheumatism for the previous eight months, sometimes with acute exacerbations lasting for two weeks, when he was obliged to remain in bed. He has been treated with sodium salicylate, with usually some temporary relief. He has also tried the alkaline treatment with more or less relief.

Spinal examination showed decided reaction between third and seventh dorsal vertebræ, especially tender on the right side; this indicating trouble of gastric origin. A second reaction manifested itself between first and fourth lumbar vertebræ, which is the sympathetic center for the large intestines. The case was diagnosed as auto-toxemia, originating in the stomach. Further inquiry elicited the fact that he was a pernicious meat eater, that his teeth were in a very poor condition, that he ate very hurriedly, and was always constipated, evacuations taking place but once in four or five days. He indulged in both malt and alcoholic ferments.

The treatment consisted in restricted diet, no food of any kind for four days; after which he was allowed raw fruit sparingly. A wet pack was administered morning and evening, each lasting for about two hours; or until perspiration was profuse. Rectal douches were given every morning, and every other day all the affected joints were treated with the static spark to promote absorption. A spinal ice-bag was applied for two hours at the same time with one of the wet packs; placed from the first to fourth lumbar vertebræ, for the purpose of increasing the glandular secretions in the colon; this treatment relieved him of all pain in two weeks. With some modi-

fications this treatment was continued for four weeks more, when he declared himself absolutely well. He has had no attacks for two years. I saw this patient in January, 1906, he was then looking and feeling well. He has changed his vocation and lives as he should. His teeth have been attended to and he now properly chews his food and uses a mixed diet.

Case V. Mr. A. Y., aged eighteen. The patient came first walking upon crutches. He had always been well up to six weeks ago, when he developed pains and swelling in one knee-joint. Shortly after both ankles became affected, so that he had a typical ankle drop, a semi-paralysis of the flexor muscles of the foot. Spinal examination showed reaction at the third and fourth lumbar vertebra, which is the genito-spinal center; gonorrheal rheumatism was the diagnosis. In spite of the denial of previous infection by the patient this was confirmed by urinalysis, the threads containing the specific germs. At a subsequent visit this patient acknowledged an infection two months previous to the development of the present symptoms. Treatment consisted in irrigating the bladder once daily with plain hot water, thoroughly opening the bowels by douches. The flexor muscles were exercised daily by applying static sparks to the motor points. The diet consisted of entirely raw vegetable food, as fruits, lettuce, nuts, etc. This patient made an uneventful recovery in four weeks.

Case VI. Miss J. A., aged nineteen, born in Sweden, has been in the United States since infancy. When nine years of age she developed epileptic attacks, which compelled her to remain home from school. These attacks gradually grew worse, they always occurred at about 4-5 A. M., very seldom in the day time; she has taken large doses of bromides, but with little benefit. At present she is very apathetic, takes no notice of her surroundings and lacks interest in all things; she is poorly nourished. Her appetite is capricious and menstruation regular and normal. Spinal examination reveals reaction between the third and fifth sacral vertebrae, which is the reflex center of the neck of bladder. The diagnosis was chronic irritation at neck of bladder exciting reflex epileptic attacks. Treatment consisted of one wet sheet pack daily for two hours before retiring, to be awakened every morning between 3 and 4 A. M. for the purpose of voiding the urine, muscular exercise in the open air long enough to induce sensible perspiration at

least twice daily. Mechanical vibration was applied over the involved reflex center, while static sparks were administered over the rest of the spine. Her attacks dropped from the usual four to five per week to one per week; after the third week they ceased entirely. She has been well now for over eighteen months, has gained in weight, and is capable of looking after her own interests. I believe that we are dealing in this case with a stone in the bladder, the patient refuses to consider an operation, and that condition has therefore never been verified.

Case VII. Mr. L. B., aged forty-five, guard on elevated railroad, has suffered for four years from rheumatism of the spine, which has been getting worse since he has been employed on the railroad. Plasters, liniments, and other routine treatments have failed to give relief. Spinal examination shows reaction and marked tenderness between seventh and ninth dorsal, the region for the liver and gall-bladder. Gallstones was the diagnosis. This was beautifully confirmed by a fluoroscopic examination. The enlarged viscus would plainly be seen to travel up and down with each respiration. The patient was sent to the hospital and operated upon. I was informed that twenty-seven stones were removed from his gall-bladder. The patient has since been well.

From the foregoing it will be apparent that a great number of so-called chronic diseases should be looked upon as symptoms of some pathological condition, for frequently, as we have seen, these symptoms promptly vanish upon removal of the cause.

Frequently a spinal examination will point to some organ or perhaps two or three at the same time, it then becomes necessary to either confirm the suspected diagnosis by appropriate symptoms associated with such a lesion, or you may arrive at the proper one by exclusion. A spinal examination may point to a lesion in the kidney. This might be any one of a dozen or more lesions that could be present, but knowing that this organ is involved, by other symptoms we are led to a correct diagnosis. The main thing to remember is that a lesion may be in one organ and give few or no severe symptoms, yet produce marked and persistent reflex symptoms. It would be utterly useless to treat the reflex symptoms unless the primary cause is removed. During the early months of pregnancy

nausea and vomiting are frequent reflex symptoms. If we were to treat the stomach we would certainly not succeed in relieving these reflex symptoms, but if a spinal examination is made under such conditions, we would find a reaction taking place between the first and second lumbar vertebræ, which is the center for parturition, and the uterus. We would then at once assume that the vomiting was a reflex one. This with other symptoms would lead to a correct diagnosis and consequent adoption of the proper therapeutic measure.

Rheumatism, neuralgia, sciatica, chorea, epilepsy, convulsions, pain of various kinds, lead colic, paralysis—all these and many others frequently arise from reflex symptoms due primarily to an autotoxemia. The treatment therefore would be the removal of the underlying cause, which, as has been pointed out, may be in a large number of cases found by an examination of the spinal reflexes. Whatever may be the cause, this must first be removed by such remedial measures as may be indicated in each particular instance.


For the elimination of toxins from the general circulation, the four avenues nature has provided for this purpose must be called into requisition. *The skin* may be made to perform its function by two physical measures, simple as they are, yet frequently erroneously employed; dry hot air up to 400° F. is the temperature to employ when the skin is anemic, the extremities cold and the internal organs congested, for by such means we assist nature in re-establishing the equilibrium. In the absence of the dry hot air apparatus, nitro-glycerine combined with pilocarpine are the drugs indicated. The wet pack is the measure to be employed if there is a condition of plethora with increased temperature and dryness of skin. *The spinal ice-bag* with local applications of cloths wrung out in cold water, the application of various evaporating lotions, hot and stimulating drinks internally may be employed. These two measures are too frequently confounded; yet their indication is clear and absolutely scientific. *The rectum* is one of the channels of elimination too often overlooked. We all know that chronic constipation is a most prolific source of auto-toxemia, and here as in all conditions, remove the cause. To simply remove or overcome the constipation is simply sparring for wind. It is true, temporary relief from symptoms will be secured, but the same causes at work will sooner or later

cause the same or worse symptoms. The causes of constipation are so numerous that it would be impossible to begin to enumerate them. However, a correction of the diet, proper mastication and digestion, the ingestion of a sufficient quantity of liquids and fats, suited exercises, large soap enemas, the hydro-electric douche, deep abdominal vibration, the sinusoidal current, as well as numerous internal remedies, from laxatives to drastic cathartics; operative procedures, from the mere stretching of the anal sphincter to the removal of hemorrhoids, strictures, and other lesions requiring operative interference, one or more of them prove effective. The genito-urinary tract must eliminate most of the water and nitrogenous material, hence when a spinal examination points to any part of this tract as the underlying cause its special diagnostic measures are indicated. Inspection of the inner surface of the bladder by visual means, catheterization of each kidney separately may be employed. Urinalysis under such conditions throws much light upon possible lesions. Shreds containing the germs of specific urethritis may also be discovered. Stone in the bladder, or even the pelvis of the kidney, can be photographed by means of the X-ray. It has also frequently been possible to demonstrate under the X-ray a tubercular kidney. There is no scarcity of methods of making correct diagnosis. The lungs and respiratory tract may be the original route of invasion; for it is not uncommon for toxemia to arise from the inspiration of noxious gases as it is to absorb poisons from the mucous membrane of the nose and throat. Whenever a spinal examination points to the respiratory tract as the offending organ, a thorough examination of the nose, nasopharynx, and the tonsils, should be made. By the assistance of the X-ray the excursion of the diaphragm can be studied, consolidation as well as cavities in the lung tissues corroborated, and frequently diagnosed before physical signs are present. The indications for treatment of causes will suggest themselves from the nature of the lesions found. If adenoids are present they should be removed early and radically. The tonsils, if hypertrophy exists, should be treated with the galvano cautery—a procedure so simple that any practitioner can perform it; and children stand it remarkably well. It is to be preferred to either the removal by knife or the enucleation method. Proper ventilation of the living quarters, especially at night, at

the same time disabusing the patient's mind of the time-worn notion that the air at night for some unaccountable reason should be worse than the air in daytime. It may be argued that such treatments as the wet pack cannot be carried out in the house of the average patient. This is not a valid reason for not trying these methods. It is true that under certain circumstances and conditions it may be difficult or even impossible, but from my experience most of the patients will carry out these various treatments with perfect satisfaction.

In looking upon chronic disease from this point of view, it is no longer difficult to understand why the salicylates should cure one patient and not the next. We know that the salicylates act as an antiseptic, as well as a germicide to certain germs, especially those which require an alkaline medium for their growth; while the alkaline treatment will make the gastrointestinal tract undesirable for those germs requiring an acid medium. We know now that iodine is the most powerful stimulant to the adrenal system we possess, and when this system is stimulated, oxidation is markedly increased, so that the administration of potassium-iodide under conditions of sub-oxidation, has shown favorable results. Yet in some distal joint the reflex manifestations might be the only symptoms the patient complained of. In early tuberculosis of the hip, the sign that is brought to our notice is the pain on the inner side of the corresponding knee of the patient. The lightning-like pains of early locomotor-ataxia are frequently misinterpreted. the pains radiating into the left shoulder and arm of angina-pectoris would be early located by a spinal examination for the sympathetic center involved.

We might go on enumerating a great many conditions where a spinal examination is of the utmost importance, requiring very little apparatus, a little practice in technique and the proper interpretation of what the sympathetic system can be made to reveal.

1239 Madison Ave. 

CONSIDERATION OF HIGH-FREQUENCY APPARATUS.

BY M. S. CLAWSON, E. E., NEW YORK.

In the July number of the Journal Mr. E. L. Ovington undertakes to controvert certain statements made by the writer in the March number.

I appreciate that space in *ADVANCED THERAPEUTICS* is valuable and the time of the readers already more than fully occupied, and I shall therefore deal with the matter as briefly as possible.

I was generous enough in the first article to state that we were not discussing the comparative therapeutic value of any of the so-called high-frequency currents, but I will say now that the range of effects which are derived from the static machine or standard coil apparatus (having the Oudin attachment) is much greater than those derived from the so-called high-frequency apparatus of Tesla. By the Standard Apparatus, I have reference to transformers or coils having the straight core or open magnetic circuit, commonly known as X-ray coils.

By the Tesla apparatus I have reference to outfits sold as *high-frequency apparatus* having a closed magnetic circuit transformer with the Tesla attachment.

In the previous article I spoke entirely of the character of these different currents, and not of the effects.

The static current which Mr. Ovington claims can be duplicated by the Tesla high-frequency apparatus is (as is well known) unidirectional, while the Tesla current is alternating. Obviously no comparison between the two is possible, either as to character or effects. Furthermore, as the difference is fundamental, no arrangement of cut-outs or cut-ins or of step-ups or step-downs can avail to effect a transformation. Then we have the Oudin current which is oscillatory, but directional in character. Placing condensers in the circuit of either the transformer or coil apparatus, as is done in generating both the Oudin and Tesla currents, produces capacity reactance only, while the general character of the current remains the same. This can be readily proven with an oscilloscope, Geissler tube, or by photography.

Transforming devices cannot produce true static discharges for there are periods of time in the flow of the initial current when there is absolutely no potential.

This is not the case with the static current, therefore, I am as safe in saying that it is impossible to construct a transforming device which will duplicate the static machine (as far as the character of the discharge is concerned) as it is to make sulphuric acid (H_2SO_4) with the elements HCl.

It should be understood that there are no very valuable patents used in connection with Tesla high-frequency transformers, and there is no reason why any of the manufacturers cannot make this type of apparatus in preference to Standard outfits, if they felt it had sufficient value to warrant such a move.

Mr. Ovington states in the latter part of this article as follows: "Far too many manufacturers describe their products in glittering generalities, to the almost total exclusion of information of value to a physician after the truth with regard to electro-therapeutics." This is exactly the point I wish to bring out and would refer to several journals in which claims that are very misleading have been made.

Such salesmanship greatly handicaps reliable manufacturers, and places the physician in an unsettled position regarding the efficacy of not only high-frequency currents, but electro-therapeutics in general, when in reality we have in electricity one of the most versatile therapeutic agents.

In speaking of human progress, I admit that it is rather rash to disregard possibilities. It is, however, quite safe to say, in dealing with currents which depend upon the rise and fall of potential for their existence, that we cannot produce a continuous flow. We might as well say that we can produce with drugs a continuous flow of blood through the arterial system, while the original force is from the heart, in which case there are periods when the organ is at rest.

I am convinced that all the different types of apparatus produce what we might call characteristic effects, the same as they produce characteristic discharges, and it is for the manufacturer to construct all of these or the one which has the greatest range.

Editorial.

THE SIXTEENTH ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSO- CIATION.

The session just closed of the Association is one the memory of which will live long with the members of the Association who were present at the meeting. The attendance was large, and the interest manifested by the members was well attested by the attendance at the scientific sessions. The papers were of an excellence that bespeaks the future of electro-therapeutics and the development of other physical measures.

A resolution was presented for an amendment of the constitution to be acted on at the next session of the Association which will change the name of the Association to that of the American Association of Physico- and Electro-Therapeutics, thereby broadening the field of consideration. Probably no feature of the occasion, however, made a deeper impress upon the minds of those present than the tokens of hospitality both of citizens and members of the profession in the city of "brotherly love." Three collations were extended to the members. One at noon of the second day by the Oncologic Hospital, under the supervision of the superintendent and board of managers of the institution, with which the Chairman of the Committee of Arrangements, Dr. G. Betton Massey, is officially associated. Demonstrations of the cataphoric method of treatment of cancer, were made at the Hospital before the members present, and a large number of cases demonstrating the results of the method were shown. No one could fail to be impressed with the value of this method of treating malignant disease. Demonstrations were also made of the method of treatment by the X-ray, and by the use of electrolysis with the continuous current. This hospital stands in the first rank of broad-gauge conservative methods, for here as in no other hospital in the land in which each department is allowed its field of operation under a fair and unbiased administration, by those particularly qualified in the various departments of surgery. The hospital is also devoted exclusively to the treatment of malignant disease. That such an institution will receive the recognition of the State of Pennsylvania, and the financial aid of which it can make such valuable use in the service of humanity, there can be no doubt.

The munificence of the State of Pennsylvania is wonderfully well exemplified in the Medico-Chirurgical Hospital and College, one of the grandest institutions of its kind in this country.

The Association are very grateful to that institution for the cordial reception and entertainment given. A finer buffet lunch could not have been provided than the one laid before the members of the Association and their guests. All partook of it with heartiness and then adjourned to the amphytheater in which the scientific session for the afternoon was held.

Mayor Weaver added much to the welcome of the Association by three times gracing the assemblies with his presence and on each occasion addressed them in his cordial, hearty style.

The officers elected for the ensuing year were, Dr. Morris W. Brinkmann, of New York, President; Dr. J. D. Gibson of Denver, Colo., 1st Vice-President; Dr. Mirrian H. Kassabian of Philadelphia, 2d Vice-President; Dr. Albert C. Geyser of New York, Secretary; Dr. Richard J. Nunn of Savannah, Ga., Treasurer, and Dr. Wm. Benham Snow, and Dr. Fred H. Morse, and Dr. Francis B. Bishop, members of the Executive Council. The place of meeting was left to be decided by the executive council and to be either Jamestown or vicinity, or New York City.

Progress in Physical Therapeutics.

PHOTOTHERAPY.

EDITED BY MARGARET A. CLEAVES, M. D.

The *Clinical Value of Blue Light* is discussed in a recent number of the International Journal of Therapy. Its merits as a remedial agent are not overestimated. The Minim method, i. e., an incandescent light of greater or less candle power placed in a parabolic reflector, is especially considered under this head. By this method there is obtained the action of dry heat and that of the deeply penetrating chemical action of the blue, indigo, and violet frequencies of light. This energy is sufficient to profoundly influence circulatory metabolic and absorptive activities. For this reason it is an excellent agent in muscular rheumatism, lumbago for example. The sedative effect of blue light shows itself by a complete cessation of sensation in the cutaneous tissues. For this reason blue light is a local

anesthetic and has a great range of usefulness, especially in minor surgery and dentistry. In emergency surgery blue light not infrequently takes the place of the hypodermic syringe.

A physician suffering from inflammation in the cellular tissue about the rectum accompanied by intense pain and prostration (probably a threatened suppurative process) was relieved by the first treatment, i. e., an exposure of the buttocks and anus to the energy from a large Russian lamp for one hour. Two subsequent treatments, and every vestige of the trouble had disappeared.

Still another physician, suffered from pain in the muscles of the chest and soreness and anxiety around the heart, as the result of being badly shaken up in a railroad accident. He was greatly relieved by exposing the anterior surface of the chest to the light of a large Minim lamp.

A case of hard chancre of the lower lip, with considerable local disturbance and glandular involvement was treated daily, exposure thirty minutes for eleven days; the rest of the face being covered with towels. Pain was relieved by first treatment, favorable reaction after the third and locally well after the eleventh treatment.

Remark.—Blue light is of remarkable value for the alleviation of pain and in the treatment of acute, subacute, or even chronic inflammatory conditions with or without effusions or organized exudates. The editor is in the habit of using the light from an arc of from 10 to 25 amperes through a blue glass screen on account of the greater quantity of the penetrating energy of the blue end of the spectrum, but good work can be done with incandescent lamps of blue glass, preferably of considerable candle power. The uses to which localized applications of light can be put are legion. One must distinguish as to the kind of light which is needed, whether white or blue, and whether from an incandescent or an arc lamp, according to physiological action and pathological change. The arc is richer in the blue, indigo, and violet and occupies a middle place between the sun and the incandescent as a source of penetrating blue-light energy.

Therapeutics of Light as Illustrated with the Leucodescent Therapeutic Lamp.

Lamson Allen discusses the above in the North American Journal of Homeopathy for August, 1906.

He has found it of especial value in cases where he was sure of the "work of ptomaines or bacteria." The tonic effect of the light is well illustrated by its action on cases of neurasthenia and indolent ulcer.

Case I. A young man, aged twenty-two. June, 1905, while moving had strained himself in lifting furniture. In a few days an abscess appeared in the right groin which later burrowed to the bottom of the right testicle. There it broke causing two swellings, one in the scrotum from whence came the pus outside and the other in the epididymis. The former was the size of an English walnut, the latter of a goose egg. On August 23, 1905, the use of the leucodescent lamp was begun, despite the advice of a surgeon that the patient go to a hospital and possibly part with his testicle. The organ was so sore and painful that the patient was confined to the house and part of the time to bed. From August 25, 1905 to March 28, 1906 he was under treatment, when he was dismissed cured.

Case II. Occipital headache—cause unknown—called neuralgia by exclusion of other conditions. Two sisters, mother, and grandmother each had and still had the same trouble. Condition aggravated by riding in electric or steam cars and by shopping.

Pain relieved by first application of light. Second treatment stopped all pain. Ten treatments in all and patient has been well ever since. Came under care September 19, 1905. Case reported as illustrating the tonic effect of the light on the nervous system.

Case III. Nurse, September 26, 1905. Indolent ulcer on left leg of two years' standing. Left ankle and foot swollen, with great soreness and stinging pain. After second treatment with the leucodescent therapeutic lamp all pain and soreness disappeared, with great reduction of swelling. New granulations in evidence on edges and margins at the beginning of the third treatment. Treatment given every second or third day, thirteen given in all. Patient dismissed October 30, 1905.

Case IV. A lad aged fourteen, October 3, 1905. Acute yellow jaundice. Ill for four weeks and yellow all over body for past two weeks. Applications were made with the light from a leucodescent therapeutic lamp to the liver and abdomen anteriorly and posteriorly for twenty minutes. Better the next day by fifty per cent. Cured absolutely by five treatments on five successive days.

Case V. Mrs. E. P. O. came October 7, 1905. For eighteen years more or less pain in right side of abdomen at McBurney's point. Diagnosed as recurrent appendicitis by five different surgeons and advised to go to hospital for removal after each attack. Left ovary removed for cystic degeneration twelve years ago. Since then three attacks of gallstone colic. Examination revealed great sensitiveness over McBurney's point, tenderness over gall-bladder, sensitiveness of right ovary to external touch and from bimanual examination, a great deal of pain extending from small of back to crest of right ilium and under both shoulder blades, especially the right. Patient re-

mained in the city three and one-half weeks, during two and one-half of which she took two treatments per day and the last week one treatment per day. At the end of that time she returned home absolutely cured and had gained seven pounds in weight. At time of report, eight months later, she remained absolutely well.

There are reported equally good results in cases of severe knee injury, chronic bronchitis associated with irritable heart with palpitation, tuberculosis of both lungs (patient with city hospital record), and tuberculosis of right lung.

Marked improvement was also obtained in a multiple cystic fibroid tumor of the uterus, undergoing cancerous degeneration. A case of multiple fistulæ about the testicles, running down onto buttocks on both sides, probably from an old tubercular cystitis, is reported. There were eighteen openings exuding from one-half to one and one-half pints of pus every twenty-four hours. Patient was obliged to void urine night and day every one or two hours. He was operated upon at one of the hospitals in the spring of 1905, without any result unless it was for the worse. He was rapidly losing flesh and strength. Nothing was promised, but twenty treatments were agreed upon.

There is absolutely no question at all of the value of this five hundred candle power incandescent lamp in general medicine. It is simple, easy to use, and the light energy thus obtained is of inestimable value in establishing in the highest degree circulatory changes, enriching the blood at the same time by increasing its oxygenating power. There is secured as a result destruction of bacteria, absorption of effusions, of exudates, increased functional activity, and improved nerve tone. Thus the action of light is curative.

By the eighth treatment he was so much improved that he would not discontinue his treatment. He came under care February 19, 1906, and by May 1, 1906, pus had ceased exuding, all fistulæ had inclosed and smoothed down, all inflammation and soreness had disappeared, and he was just about to be dismissed when he carelessly got wet in a cold rainstorm and a phymosis appeared. At time of report this had not disappeared. Pus and soreness had reappeared in some of the old fistulæ, which, however, were rapidly healing again.

Improvement of varying degrees was being obtained by Allen in cancer of the uterus and breast.

Remark.—Nothing is truer than that all of light therapeutics is not embodied in the Roentgen ray. I would not include the Finsen ray as does the writer of the above article, for after all, Finsen utilized the entire spectrum visible and invisible (shorn of its heat) and that from arc lamps of great amperage (80 amperes). In this way, and by condensation as well as con-

centration, he obtained the action of the greatest quantity of penetrating light energy. The interesting and practical point, however, is that so much good therapeutic work can be done with light apparatus of simpler construction and lesser expense, and at the same time adaptable to a very much greater range of pathological conditions than is a Finsen tube.

Of the means to the end the leucodescent therapeutic lamp is of great value, and I can substantiate the value of light in even a wider range of conditions than those enumerated by the writer quoted.

An extensive varicose ulcer of ten years' standing in a woman of sixty, by occupation a cook, was absolutely cured inside of four weeks; eight applications only being made of the light of the visible spectrum from a leucodescent therapeutic lamp. In this case the leg was swollen, painful, and sensitive and the patient suffered from great disability. There was swelling and blue discoloration from the lower border of the upper third to the ankle, the veins were knotted from above the knee down and stood out like whip-cords.

From the first exposure the dozen or more broken-down points, involving altogether an area of nine square inches, scabbed over save one which filled in more slowly by granulation. None of them broke down afterwards. The patient kept at her work. No dressings of any kind were allowed save a surgically clean and loosely woven bandage lightly applied.

After thirteen years' use of light as a therapeutic agent, I give the visible spectrum as obtained from arcs of from 10 to 25 or even more amperes, and incandescent lamps of high candle power, as the leucodescent, preference over and above every form of radiant energy other than sunlight. But as the latter is unavailable for city practice and at seasons of the year for country practice, it follows that the artificial sources of light indicated are the most practical.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

The Treatment of Arthritis Deformans with the Roentgen Rays. By J. M. Anders, M. D., Judson Deland, M. D., and G. F. Pfahler, M. D., Jour. A. M. A., May 19, 1906.

Case 1. A miner, admitted to the hospital, suffering with his feet from enlargement of the joints of his toes, which were

very painful, had not been able to work for a year. When he improved, he was able to work for four months. Since that time, which was fifteen months before his admission to the hospital, he had not been able to work on account of the stiffness, swelling, and tenderness of his joints. Four months after his admission, his left wrist became involved, soon followed by involvement of his shoulder and elbow. The movement of joints was very much restricted. Radiographic examinations disclosed decalcification of the bones of the wrist-joint, with erosion of some of the joint surfaces, and exudate in the joint spaces. The elbow showed a similar decalcification, with some exudate in the joint space, and a roughening of the tip of the olecranon.

For experimentation, the joints of the wrist, elbow, and shoulder of the left side were selected for treatment. These joints were all brought under the influence of the X-ray at one time. A medium tube fifteen inches distance was used, one milliamperere of current passing through the tube and séance lasting for fifteen minutes. After the first treatment pain was lessened. After third treatment stiffness was much lessened. After sixteen treatments the three joints treated were practically well, and all movements were almost perfect, and the radiograph nine weeks afterward showed only a very slight difference in the joints of the two sides. Sodium iodide was administered at the same time, while the joints treated were practically well, the joints that were not treated were in the same condition as when treatment was commenced. These latter joints were then treated by the X-ray and progressed so favorably that in four weeks the patient was able to sew up the cuts in his shoes made to make room for his feet one year previous.

Case 2. This case gave similar history to the preceding. The knee was most involved and selected for treatment, the technique employed was similar to that in Case 1. After ten days with four treatments, the pain had nearly subsided, and the man could move the joint much more freely. After five weeks and fifteen treatments, the previously bed-ridden patient was able to walk out of the hospital and go back and forth for his treatments. They were lead to investigate this treatment by the most excellent reports made by Moser on the treatment of rhumeumatism and gout by the X-ray.

Zur Galvanokaustischen Behandlung der Prostata Hypertrophie nach Bottini. K. Vogel, Deutsche med. Wochenschrift, Berlin and Leipsic.

This is a very important report. Shede operated on a man of seventy-one. Used antiseptic precautions and Bottin's Technique with a fatal result half an hour after the operation. The post-mortem showed that the cauterization had not been deep,

and it seemed that the fluid in the bladder cooled off the burner, or the galvano-cautery was not strong enough. In another case he used no fluid in the bladder, and the patient died forty-eight hours later from acute peritonitis. In this case the autopsy showed that the bladder wall, not being distended, must have lain in folds, and the cautery cut through one of these folds, making an incision three cm. long, with consequent escape of urine into the peritoneal cavity and fatal inflammation. Freudenberg has published a similar case. It seems, therefore, that it is indicated to distend the bladder and use the galvano-cautery current strong enough, guiding the depth of the incision by the finger in the rectum.

The X-Ray in the Treatment of Rodent Ulcer. By J. Hall Edwards, L. R. C. P., British Medical Journal.

He claims that rodent ulcer is a superficial form of epithelioma, and usually appears on a mole or wart as an ulcer and increases very slowly. It has a somewhat indurated border, the edges are hard and usually inverted and with absence of all granulations; and usually very slow in its progress, but does not as a rule affect the neighboring glands. It is a disease of adult and aged life. The doctor thinks that for this treatment it is necessary to produce a marked reaction, and he mentioned a good many cases which had been cured for two years without recurrence. The doctor notes that in most cases the punched-out appearance of rodent ulcers persisted when completely healed. The doctor reports five cases of rodent ulcer, some of them of extreme severity, in which success has been all that could be desired, and is to be congratulated upon his splendid work.

The Nernst Lamp for the Production of Ether Waves for Use in Therapeutics.

Rollins finds that the Nernst lamp has two advantages over the lamps constructed with incandescent bulbs: first, there is no loss in the short ether waves; secondly, the consumption of current, for the same number of light waves, is less. He does not believe that it will superede the older form of lamps, but believes that it has a place of its own in light therapeutics.

THERMOTHERAPY.

EDITED BY DAVID E. HOAG, M. D., NEW YORK.

Heat and Cold. By John W. Wainwright, M. D, New York, in the Dietetic and Hygienic Gazette, for July.

Wainwright first describes the action of heat and cold according as it is dry or moist. He considers its effects as they differ in kind and degree, and as to whether it is applied locally

or generally. As an illustration of the local treatment, he refers to a case of true inflammatory rheumatism in which the focus of infection was in the joint itself. While the same treatment applied to the same locality in a disorder due to impaired trophic centers is valueless.

He speaks not only of the general diaphoretic effect of hot-air baths, but also of the effect upon the whole body through the spinal sympathetic system, due to reflex action. He believes that both the red and white blood corpuscles are increased in number, and that the amount of urea excreted is notably increased. He regards the local hot-air bath as the treatment par excellence in sprains, employed at a temperature of 250° F., gradually increased to 350° F.

Excellent results are claimed in some cases of organic heart disease, in those suffering from cold hands and feet, and in patients with general debility and anemia. The author very wisely states that we must not expect too much from hot-air baths alone, but should use them as an adjunct to other forms of treatment.

Evidence is also given of the value of this treatment in nervous affections, special attention being called to cases of peripheral neuritis accompanied by joint lesions. The author then goes on to cite cases of chronic catarrhal otitis media, characterized by ankylosis of the ossicles. The method employed was to send into the auditory canal a current of air at a temperature which gradually attained to 400° F. The only discomfort noticed was the severe headache, but this was promptly relieved by a dose of codein. This same method, he recommends in various affections of the nasopharynx.

He believes that hot-air treatment is unsuited to cases where pus is present, or in those patients suffering from fatty degeneration of the heart. He also recommends the use of hot water bags and bottle as a simple, inexpensive, and efficient means of obtaining a local action of heat in cases of facial neuralgia.

The author also reviews for us the use of moist heat in the form of poultices, in many cases of inflammations of the internal organs. He recommends that in the use of heat in gynecological practice, the degree of heat is the most important factor. Superheated steam has been used with great advantage in controlling hemorrhage from the liver and other internal organs during operative procedure.

The author sums up the use of hot air as a therapeutic agent as follows: (1) Dry heat is a valuable pain reliever without the depressing effects so common with drug. (2) In connection with constitutional and medicinal treatment we have in it a positive and curative agent. (3) It is a stimulant to rapid repair and absorption. (4) It is one of the most valuable eliminative agents we possess. (5) Where indicated, it pos-

sesses a sedative action on the nervous system obtained by no other means.

The author then goes on to summarize in a most comprehensive manner the great number of uses to which the action of cold may be applied.

CLIMATOLOGY.

EDITED BY BOARDMAN REED, M. D.

Citronelle, Ala.

Citronelle, Ala., is situated on a sandy plateau, elevated 366 feet above the sea level, and is the highest point at the same nearness to the seacoast between Mexico and Massachusetts, being located on the M. & O. R. R., thirty-two miles north of Mobile.

There are express, telegraph, local and long distance telephone, post-office, national bank, good markets, etc., three hotels and numerous boarding houses.

Citronelle has been endowed by nature with the essential elements of climate which are of prime importance in the treatment of all catarrhal, respiratory and nervous diseases. The air is very pure and dry and charged with ozone and the balsamic odor of the long leaf yellow pine, with which the whole country is covered.

The abundant supply of pure spring water is shown by analysis by Prof. Palmer to be 99.9996 per cent. pure, containing only one and a one-half grains of mineral matter to the U. S. gallon. There are also numerous mineral springs, one of which, the Cherokee Chalybeate Spring, received the highest award at the Louisiana Purchase Exposition at St. Louis in 1904.

It has a clay sub-soil and is quickly drained from rainfall so that walking dry-shod is possible shortly after a shower. It has an equable temperature, the mean temperature of January, 1904, the coldest month, being 49 degrees. That of September the warmest being 78.90, so that roses, violets and other flowers frequently are seen blooming during the winter.

Its reputation as a health resort has been established for many years by genuine cured cases of hemorrhagine, pulmonary phthisis, and other respiratory and catharrhal affections. Patients suffering from insomnia and neurasthenia are soon benefited and find sweet, refreshing, natural sleep, and soon begin to put on flesh. It is remarkably free from malaria and its pernicious influences, so that it is an all the year resort; the Southern people seeking its cool breezes and pure air in Summer and the Northerners finding it pleasant and healthful the year around.

A Winter Chautauqua was established with great success

during the past Spring, giving a four weeks' programme. Eminent specialists in Northern and Western cities are now sending their patients to Citronelle in preference to the more distant points which are less accessible.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

The Rôle of Hydrotherapy in the Treatment of Febrile Infectious Diseases.

Dr. S. Baruch states the principle of Hippocrates, "Cold water warms; warm water cools," and remarks that at the present time many believe just the opposite. He sketches the history of hydrotherapy in Russia and Germany, and speaks of its misinterpretation until Winternitz and Brand showed so clearly that the temperature decrease in fever by means of the cold bath is not the element of greatest importance. In Germany the Brand idea was almost brought into disrepute because the technique was not carried out according to the directions of the author. In America the same would have been the case had Baruch not worked against it by word and deed. He prescribed baths at 20°C. (68° F.) with vigorous rubbing of the skin for five minutes, every three to four hours, if the patient is awake, until the rectal temperature is reduced to 39.5° C. (103.1° F.). He lays great stress upon the careful observance of the technique in hydrotherapy, and upon the abandonment of general terms like cool, cold, warm, and hot in prescriptions, recommending instead that the exact temperature in figures be given.

The principal effect of the use of the cold bath in febrile diseases is the powerful reaction of the organism which is thus called forth, and the increase in resistance against the toxins circulating in the blood. The effect of the cold is to contract the blood-vessels of the skin, but this is counteracted by the mechanical irritation, under the influence of which the vessels are dilated, as shown by the glow, and an increased quantity of blood is thus cooled.

The author discusses also the cold bath for diagnostic purposes as follows: In a patient having a temperature of 38.5° C. (101.3° F.) or over, the trunk is sponged with water at about 29° C. (84.2° F.). In each succeeding procedure the temperature of the water is decreased two degrees till 15° C. (59° F.) is reached. After each application the patient is dried, and a compress of three thicknesses of cloth wrung from water at 15° C. is applied to the abdomen and covered with a flannel bandage somewhat larger, fastened with safety-pins. In case the temperature remains at 39.5° C. (89.6° F.)

Apply with vigorous friction, lasting twelve minutes. If the temperature increases in spite of this to 39.5° C. inside of four

hours, the bath at 29° C. is repeated; four hours later at 26° C. (79.7° F.), and four hours after that at 23° C. (73.4° F.), each time the rubbing of the skin being carefully observed. In case one of these baths decreases the rectal temperature two degrees, the diagnosis of typhoid is clear, because of the decided antipyretic effect of the cold bath in this disease. In inflammation of the lungs the author does not use the cold bath because of accompanying pleurisy, but uses instead the cold compress to the chest, wrung from water at 15° C., changed every hour when the rectal temperature is above 38° C. (100.4° F.).

Pneumonia. By George Dock.

Dock in the Jour. A. M. A. says—I admit that it requires some courage, and often involves much difficulty to change from the use of the hypodermic needle or Dover's powder to the ice bag, but those who have used the latter will agree with me when I say that one can often see patients crying with pain in spite of liberal doses of morphine, who quickly become calm with the ice bag.

Heat sometimes seems to relieve pain as well as cold, but the latter has other advantages. Among these is the relief of the cough, and the improvement of the breathing.

Fever rarely requires active treatment in pneumonia. Coal tar antipyretics are with reason reprobated in print, but still used too much in practice. If the nervous or cardiac symptoms are severe, not from the fever, generally, but from intoxication, ice bags or cold coils to the head and heart region, or bathing are useful. If the symptoms are only moderately severe local ice bags, or coils, with tepid sponging of the body, will suffice. If toxic symptoms are marked the full bath, as in the Brand treatment, either beginning at 65 F. or reducing from 85-90 F., according to the case, with friction, often gives striking relief to all the symptoms.

I consider the heart and vascular conditions as the most important single ones in pneumonia. So-called cardiac stimulants, however, are not always needed, and when they are, the ice bag externally, hot milk, beef tea or coffee internally, come into use before medicines. Hypodermoclysis, often used for circulatory weakness, I shall also not consider, though I recognize the value of the method in introducing water into the body.

As regards external applications, the only routine ones I use are the ice bag and coil. In some cases, old people or babies especially, cotton jackets are used instead, but even in young children a light ice bag, both kept on all the time in all cases, or a cold coil, often seems better than any other treatment I have seen.

The cold bath is invaluable in some cases, but not necessary in all.

STATIC ELECTRICITY.

EDITED BY J. H. BURCH, M. D.

Experience with Static Electricity. By Neil A. Gates, M. D.
Physician and Surgeon, June, 1906.

Dr. Gates insists that to obtain good results from static electricity a good machine is imperative. He attributes a large percentage of the failure to obtain results from the various electro-static modalities is due to cheap and defective apparatus. He most justly warns his brother practitioners against purchasing the various poorly constructed machines of fine appearance that are sold at a nominal price but only serve as ornaments in the physician's office. Dr. Gates is not in accord with the theory that static electricity owes its efficacy to suggestion. He believes, on the contrary, that the static modalities penetrate the deeper organs and structures and cure by relieving stasis and inflammatory conditions. He also dilates upon the necessity of a suitable room for static work. It should be large and dry, and the more space around the platform the better. Especial attention should also be given to the ground wires.

Dr. Gates affirms that the first essential in the administration of electro-static modalities is a careful study of the patient. He asserts that to some patients all electro-static discharges are disagreeable. By beginning the treatments with short séances of static insulation, followed by the breeze, care being taken to avoid shocks, the fear soon subsides and the benefit that he derives from the treatment soon inspires faith and confidence.

In giving treatments the patient's clothing must be taken into consideration, whether woolen or cotton, and remember where pins and steels are likely to be concealed.

Dr. Gates lays particular stress upon polarity in the administration of static discharges. The positive pole acts as a stimulant, while the negative is a sedative. This applies to insulation, he affirms, only, for in the application of the breeze and spark the reverse is true.

Dr. Gates reports eight very interesting cases successfully treated by means of the various electro-static modalities.

One case of insomnia as the result of overwork was quickly relieved by the indirect positive spray. Another case of neurasthenia accompanied with insomnia was relieved by potential alternation. A patient who had suffered for eight years with lumbago was quickly cured during a recurrent attack by means of indirect positive sparks. A patient suffering from atrophy of the shoulder caused by an injury was successfully treated by means of the Leyden-jar current, as was also a case of persistent acne indurata cured by means of the positive breeze from the wooden electrode.

SOCIETY MEETINGS.**SIXTEENTH ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION, AT PHILADELPHIA.****SEPTEMBER 18, MORNING SESSION.**

The meeting was held in the College of Physicians of Philadelphia, and was called to order in *Executive Session* about 9.30 A. M. by the President, Dr. William Benham Snow of New York City. Prayer was offered by Rt. Rev. Dean Groton. Addresses of welcome were given by His Honor Mayor Weaver; Dr. Charles K. Mills, President of the Philadelphia County Medical Society; and Dr. John V. Shoemaker. Mayor Weaver spoke as follows:

Mr. President, Ladies and Gentlemen, Delegates to the Sixteenth Annual Meeting of the American Electro-Therapeutic Association: It is with very great pleasure that as Chief Executive of this city, I welcome you here to the city of Benjamin Franklin, to the city of great medical schools, to the city that has always taken a vast amount of interest in the progress of medical science. I welcome you as representing, perhaps, the greatest progress in medical science. There have been some great achievements in this science during the last century—the discovery and application of anesthetics, perhaps, goes farther beyond anything else in the progress of medical science. I do not know that the discovery of the X-rays and the application of electricity in medicine in years to come will not be ranked even above the discovery and application of the anesthetics in medicine. You do not yet fully know what you have discovered, for as years pass you will find new opportunities for its use that you do not yet dream of. It may be within the bounds of possibility that even the anesthetics now used will not be employed when it is known all that can be done with the X-rays and with electricity. I am going into the field of conjecture, but I want to say a word of encouragement, because I know that in every branch of science, in every branch of business as soon as there is a new discovery, there is encountered an ultra-conservatism which advises against the use of any new methods or discoveries. That which the world wants to-day, however, is progress,—progress in all the sciences, and above all else, in the science of medicine in bringing relief to human suffering.

I say that it gives me very great pleasure to welcome you to the City of Philadelphia, to the city of Benjamin Franklin, to the city where Benjamin Franklin discovered all he knew about electricity, to the city that has an Institute bearing his name,

that was founded by him, that has still within its walls the old instrument said to have been used by him in applying electricity to the body of a paralyzed person.

I welcome you also to the City of Philadelphia, which is the only city that can boast of a hospital for the treatment of cancer, that dread disease, second perhaps only to the great white plague, consumption, second, not perhaps because of the numbers of cases, but owing to the fact that there seems to have been absolutely no cure for cancer, for in spite of the surgeon's skill there is recurrence. I understand that you are applying electricity in the treatment of this dread disease. You do not yet know the utmost that electricity will do in this regard, but I welcome you as a learned body interested in the progress of medical science, and I am sure that great good will come from your convention.

I welcome you here to the City of Brotherly Love, and when I think of the X-rays I sometimes feel that I should be glad for the discovery of some form of X-ray by which we could not only look through the human body, but by which we could look through the body politic. If in this way we could see the concealed diseases of the political body I am sure we could find the remedy for their correction.

I welcome you most heartily to the City of Philadelphia, and I wish you abundant success, not only in your convention, but in your professional careers.

Dr. Charles K. Mills followed the Mayor in welcoming the Association:

Mr. President and Members of the American Electro-Therapeutic Association: Not only as President of the Philadelphia County Medical Society and teacher in one of the Philadelphia medical schools, but also because of interest in the work and an appreciation of the valuable work of this Association, I am glad to add my words of welcome to those of His Honor, the Mayor. Personally, I have a deep interest in the subject of electro-therapeutics and, perhaps, at the risk of saying too much of a personal nature, I might refer to the fact that in my very early professional life I devoted much time to electro-physics, or to physics in general, and the first teaching position I ever held in medicine was that of lecturer on electro-therapeutics in the University of Pennsylvania.

It is appropriate that we bear in mind the indebtedness which every member, not only of this Association, but every member of the medical profession, bears to those professional men who laid the foundations of electro-physics, to men like Coole, Ampere, Ohm, and later Professor Roentgen and to Michael Faraday, who, when approached by one of his friends to go into some practical business, made answer that he did not have time

to make money. He did have time, however, to devote to investigation which has marked bearing upon your work to-day.

My mind also goes back to the great men in our own profession, and especially in the department in which I am interested—neurology—who have done much and added something to the science of electro-therapeutics. In my very early days at least one or two members of this Association were like myself concerned in electro-therapeutic teaching. One was Dr. Morton of New York, and Dr. Rockwell, who was at one time the colleague of my old friend Dr. George M. Beard.

Another thing which has occurred to me is the great difference between what is done with electricity in medicine now, and what was done in the early days when I began to teach the subject at the University of Pennsylvania, the great advances which have been made since then. At that time the use of electricity in medicine was restricted in diagnosis to the differentiation of a peripheral from a central palsy; in treatment, to the relief of pain by the use of galvanic currents, to an attempt at cataphoresis, and to its employment in a few other conditions. How great a difference is shown by the program of this Association. We have the X-ray and we all know its great value in diagnosis. I have had the opportunities of showing by means of the X-ray the position of tumors of the brain, and I need not call your attention to its value in spinal and in intracranial disorders which would come under the work of the neurological diagnostician. It is in the newer applications of electricity, in the higher tension currents, and in static electricity, and in the various directions indicated by your program that we have made the greatest advances.

Finally, I would say that, as His Honor the Mayor has said, we do not know what electricity has in store for us. We have not only these immediate practical results, but I believe that we shall learn a great deal about the nature of neural force, and of the largely unknown gray matter as the result of our observations in electricity.

Dr. J. V. Shoemaker spoke in part as follows:

Mr. President, Your Honor the Mayor, and Members of the American Electro-Therapeutic Association: I suppose your Committee has elected the speaker who addresses you upon this occasion by reason of the fact that he is associated with one of the colleges of Philadelphia, and also by reason of being an early teacher upon the subject of electro-therapeutics in Philadelphia. I want to add that a large number of the members of this Association have been known to the profession of Philadelphia for many years, and that your work and the development in the subject of electricity have been similar to that in many of our institutions. I remember Dr. Mills' early work in the University of Pennsylvania and in

the Jefferson Medical College. He was one of the early workers in electro-therapeutics. As a student I went also to the Wagner Free Institute of Philadelphia and there, too, Dr. Mills discoursed the most learned lectures upon electro-therapeutics to a very small number of workers in this community. Comparing the interest of to-day in electro-therapeutics with that of those times, we see a wonderful development. I have drawn my inspiration from many of the members of this Association. Here is my old friend Waite of New York City who makes such wonderful apparatus, and whom I have many times asked to come over and meet the students of the Medico-Chirurgical College. He gives them such an array of facts that they gain a very great deal of information on the subject of electro-therapeutics. In the hospital where we hope to welcome you to-morrow we have a room specially adapted to the use of electro-therapeutics. I recall a man coming to us a few years ago suffering with arthritis deformans. We tried faithfully and well for some six weeks or eight, the different currents of electricity, and we made such progress that he walked in the presence of the class. This result was accomplished with electricity and good food. In locomotor ataxia you can give a patient much comfort by the application of electricity to his spine, and in many of these patients the mental effect is so profound that they are greatly benefited. Also in pathological conditions of the prostate gland we have seen wonderful amelioration from the application of electro-therapeutics.

I hope to have the pleasure of doing my part in welcoming this Association on Thursday to the Medico-Chirurgical Hospital, and at that time I hope also that we may have the presence of His Honor the Mayor.

Dr. Charles R. Dickson of Toronto, Canada, on behalf of the Association, responded to the addresses of welcome:

Mr. President: It gives me great pleasure to respond on behalf of the Association to the gentlemen who have spoken, and to say how glad we are to be in the City of Brotherly Love, the city that Benjamin Franklin has made so famous, and the city that has made Benjamin Franklin so famous in return, and to say that we shall be very glad to accept all the invitations.

It is a great pleasure to have neurologists welcome the electro-therapeutists; the day was when the relations were not so friendly. It is a great treat to know that the subject of electro-therapeutics is not regarded as something akin to hypnotism.

The welcome has been so very, very cordial that it will be impossible for me to express, short of two or three hours, how pleased we are to be here, and I am sure that this feeling of brotherly love for which Philadelphia has renown all over the

world shall permeate our entire beings. Personally, I have felt so at peace with the world since I came into the city last night that I know I shall be a perfect lamb before I leave.

NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

NEW FEATURE IN X-RAY COILS.

The breaking down of X-ray coils is largely due to metallic substances in close proximity to the secondary winding. This may not be noticeable for a long time or may show the effects in a month or so after a coil is set up. If the energy from a coil is not entirely confined (by perfect insulation), the leakage which takes place from points of escape gradually develop and eventually carbonize paths to points of lower potential, greatly lowering the efficiency of the coil or grounding the secondary



discharge completely. That this leakage must be entirely held back or the coil break down is inevitable.

The cut represents a coil mounting which is free from metallic fastenings and has no sharp corners or sharp edges. Dampness is in this way excluded as the entire mounting can be wiped with oil and kept entirely free from points and surfaces which permit dust and moisture to accumulate. The coil is first built up in wax and afterwards mounted in the cabinet. Paraffin is then used to exclude dampness from inside of the case.

These coils are patented and manufactured by E. B. Meyrowitz, 104 East Twenty-third Street, New York City.

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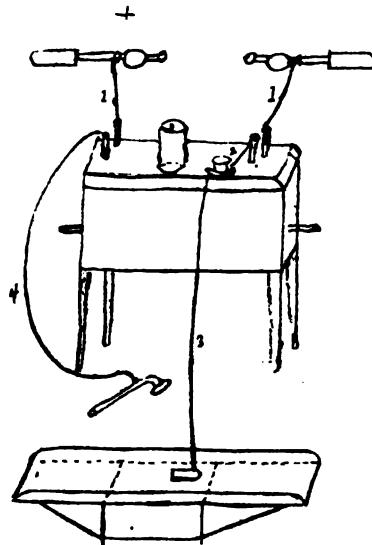
NOVEMBER, 1906.

NO. 11.

METHODS OF PROCEDURE IN THE USE OF HIGH-FREQUENCY CURRENTS.*

BY FREDERICK DE KRAFT, M. D., NEW YORK.

The modern static machine seems particularly well adapted as a means of charging the Leyden jars of a resonator on account of its extremely high potential discharge.



1—1. Connection from terminals of static to Leyden jars; 2. Connection from D'Arsonval post to meter; 3. Connection from meter to metal plate in contact with patient; 4. Connection from D'Arsonval post to glass vacuum electrode.

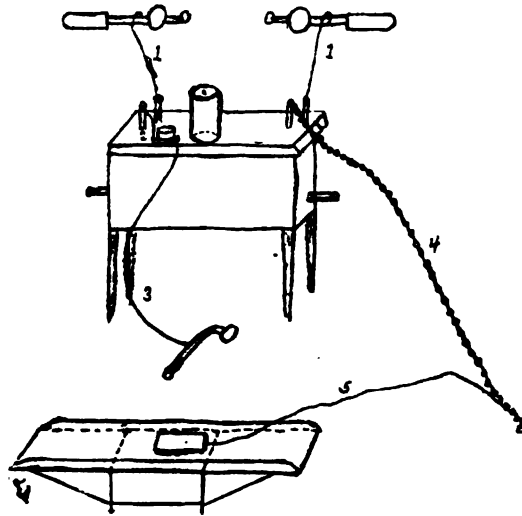
A machine to be used for this purpose should have at least twelve revolving plates, be placed in a large dry room to which the sun has access, and should be kept thoroughly dry within

* Presidential address delivered at the Sixteenth Annual Meeting of the American Electro-therapeutic Association at Philadelphia, September 18, 1906.

the case by storing therein as much as possible of unslaked lime, in slatted boxes, covered with two layers of muslin, and a machine thus well cared for is capable of giving an efficient discharge every day in the year.

The currents of high frequency and high potential which can be obtained from such machine and resonator, are the D'Arsonval, Tesla, and Oudin currents. The D'Arsonval current can be utilized by three methods:

First.—The direct, bipolar method is effected by using a metal plate, as the indifferent electrode attached to one end of the solenoid, and a glass vacuum electrode, or metal electrode, connected to the other end of the solenoid. The latter electrode



1—1. Connection from terminals of static to Leyden jars; 2. Connection from D'Arsonval posts to meter; 3. Connection from meter to vacuum electrode; 4. Connection from D'Arsonval post to ground; 5. Connection from ground to metal plate in contact with patient.

is placed upon the point of diseased condition and attached to the side of the positive Leyden jar; or

Second.—This current may be used in the indirect or grounded method. Here we ground the end of the solenoid on the side of the negative Leyden jar, ground the indifferent metal plate electrode, and place the glass vacuum or other electrode—(connected to the other end of the solenoid)—to the seat of disease.

In practicing these two methods, we place our patient on the insulated platform, using well-insulated cords as short as possible. These cords must be carefully prevented from touching the patient when employing glass vacuum electrodes lest painful sparks strike the patient. The glass electrodes should be of low vacuum and have a leading-in wire. The metal balls at the spark-gap should touch each other when first completing the arrangement of current circuit, and then be carefully separated to the length of spark-gap desired. A hot wire meter should be placed in circuit.

The indirect, or grounded method, has been very successfully used by the writer in five cases of traumatic synovitis with effusion of the knee-joint. Two applications of ten minutes' duration, using 150 milliamperes, and allowing two days to intervene between treatments, have sufficed to remove the swelling and pain in each case. One case was of three months', one of four months', one of eleven days', another of a week's, and the last of six months' standing.

This method has also been efficient in cases of gonorrheal metritis and vaginitis. With it, tubercular glands have been removed in two cases. Three cases of gleet have been cured by placing the parts in a cup-shaped electrode filled with saline solution, connecting this to the side of the negative Leyden jar and placing the grounded metal electrode to the perineum.

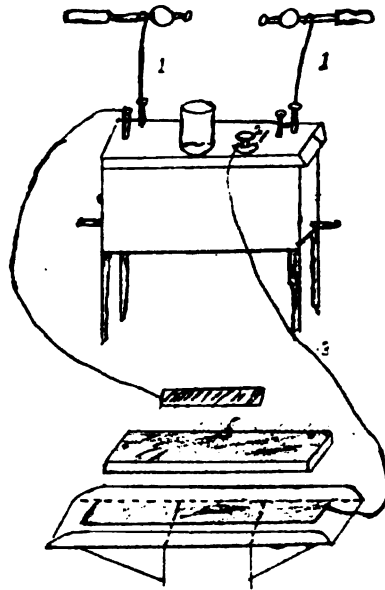
Several cases of gonorrheal rheumatism have been successfully treated by placing the grounded metal plate on one side of joint and the glass vacuum electrode on the other, using a current of 250 milliamperes for from five to ten minutes, according to the tolerance of the skin. Immediately after such an application the skin will be very red and covered with wheals. In a day or two the skin will peel off and the swelling subside. Two or three days should intervene between applications.

The *third* method of utilizing the D'Arsonval current is that of auto-condensation. We make use of the ordinary folding chair employed in other static modes of application. Place on this a piece of tin foil (22-in. gauge), large enough to cover the full length of the chair. Over the tin foil put two or more layers of very thick, soft felt. Place the patient on the chair thus prepared; now connect one end of the solenoid to the metal underneath the felt, and place another metal plate, 7 x 10 inches,

on the patient's abdomen or chest, connecting this to the other end of the solenoid.

The wires used should be short as possible and well insulated. A hot wire meter should be employed. Though it cannot be said that a hot wire meter measures the current with accuracy, it is the only means we have at present which gives us some idea of the rushes of current.

The class of cases that have yielded best results in my hands



1—1. Connection from terminals of static to Leyden jars ; 2. Connection from D'Arsonval post to meter ; 3. Connection from meter to large metal plate on chair ; 4. Connection from D'Arsonval post to small metal plate in contact with patient ; 5. Felt between large metal plate and patient.

has been conditions due to faulty metabolism, to improper living, excesses in food and drink, and insufficient exercise.

In five cases of obesity a reduction of from eight to twenty-five pounds has been accomplished within two months.

In several instances, men who had been drinking heavily for some weeks, and suffered as a consequence from gastric disturbances, insomnia, nervousness, etc., have been relieved and put in condition to resume their accustomed duties. This, too, in from two to six treatments.

Cases of gonorrheal rheumatism have been very much bene-

fited. The following cases may be cited: C. D. H., æt. twenty-eight, musician, contracted gonorrhea six years ago which was never completely cured. He came to me December, 1905, suffering from gleet, pains in various points, irregular fever, nasal and pharyngeal catarrh, and was very anemic. He was placed on the auto-condensation couch for fifteen or twenty minutes three times weekly, and a current of 400 milliamperes passed. At the end of the second week occurred what seemed to be a reaction: violent fever (temperature $104\ 1-2^{\circ}$), pains in joints, and sore throat. This passed off in two days and treatment was resumed. The gain from now on was rapid. His weight increased twenty pounds in three weeks.

He then brought his wife for treatment. She had had pus tubes removed several years before. I found her suffering from sharp pains in the abdomen, purulent local discharge, etc. Fourteen applications of auto-condensation, twenty minutes each, 250 milliamperes, benefited her very materially.

Cases of pulmonary troubles have responded well. J. P., æt. sixty, merchant, had pneumonia in 1896. This was followed by empyema, which was evacuated, and recovery resulted. Had syphilis one year later. On July 4, 1905, he was seized with a chill and pain in the left side, the site of the previous empyema. I found his temperature 103° , dullness on percussion on the left side, some râles and great prostration, as well as pain, stiffness, and swelling in knee, elbow and shoulder joints. The usual methods of treatment in such cases were employed at his home but without material benefit. A few tubercle bacilli and many streptococci being found in his sputum, he was advised to come to the office for treatment. This he did on September 10. He was placed on the auto-condensation couch every other day, a current of 250 milliamperes was employed for twenty minutes, followed by sharp resonator sparks to chest and joints. His recovery was complete October 13.

In two cases of herpes zoster auto-condensation gave great relief from the pain, hastened healing, and improved the general health, which had been poor previous to the onset of the trouble.

In cases of neurasthenia and hysteria much good has been accomplished by using three or four thicknesses of felt and a current of 150 milliamperes for twenty minutes. The object in using so much felt is to increase the resistance, making it possible to use a greater spark length at the exploders, thus in-

creasing penetration without too much amperage. The effect on these patients was a quieting one, and a great improvement in general nutrition and ability to sleep.

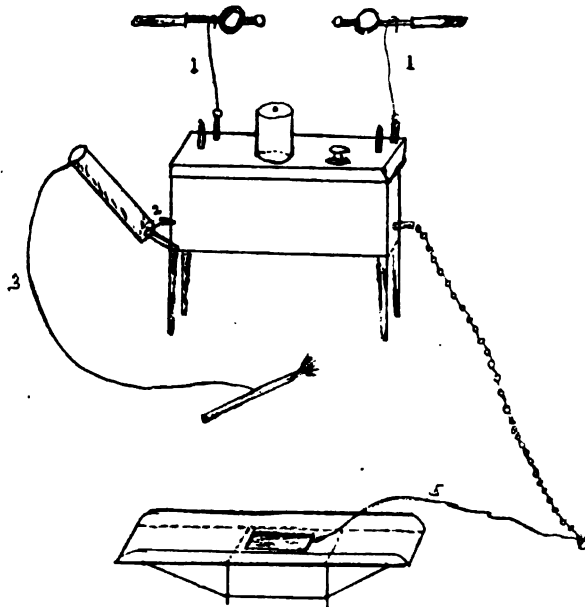
The Tesla current has not been used by the writer to any great extent, owing to its lacking adaptability for the bi-polar methods to which we have found the D'Arsonval current applicable.

The spark from the Tesla has a peculiar arborescent appearance when it strikes the skin, showing its lack of penetration.

The chief use of the Tesla is as a means of step-up from the D'Arsonval to the larger solenoid.

The Oudin Current.

This Oudin current is possessed of penetrating properties to a high degree, as can be shown in the following manner.



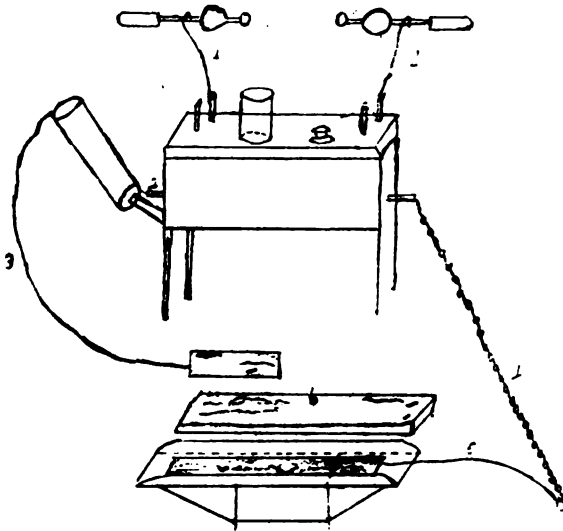
1—1. Connection from terminals of static to Leyden jars; 2. Connection from Tesla post to solenoid; 3. Connection from solenoid to brush electrode; 4. Connection from Tesla post to ground; 5. Connection from ground to metal plate in contact with patient.

Have several persons join hands and stand before the resonator in action. Let the first person in line be connected by wire and

metal handle to one end of the Tesla. Have the last person in line hold a spray electrode in his unoccupied hand so that the spray, six inches in length, strikes the other hand. We will observe rhythmic, muscular contractions in the hands of all the persons forming the chain, whether this chain be two or twelve persons. This shows the great pressure of the current.

If we take a fluoroscope and hold the spray electrode against its bottom, we will see the screen fluoresce, showing the actinic properties of this spray and spark.

The methods in which we can use the Oudin spray are two: one, the mono-polar method; the other, the bi-polar. The first



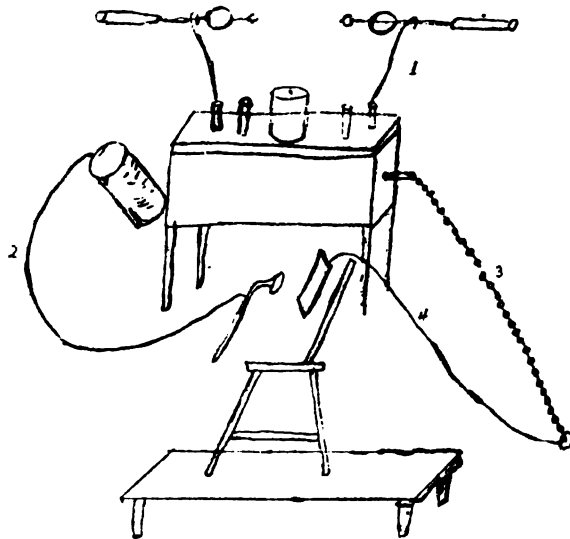
1—1. Connection from terminals of static to Leyden jars; 2. Connection from Tesla post to solenoid; 3. Connection from solenoid to small metal plate in contact with patient; 4. Connection from Tesla post to ground; 5. Connection from ground to large metal plate; 6. Felt between large metal plate and patient.

is practiced by having the patient on the insulated platform, or on the ground, while the operator holds the spray electrode far enough away to prevent the passage of sparks.

The second method is effected by having the patient on the auto-condensation chair, grounding the metal plate as well as one end of the Tesla, and holding the spray electrode at a sufficient distance from the part to be treated. The difference in the two methods is simply a difference in degree of intensity.

The same procedure can be adopted when using the spark. The spray and spark are chiefly useful in skin diseases, eczema, psoriasis, sycosis, warts, small epitheliomas, and varicose ulcers, etc.

Another method of using the Oudin current is that of auto-condensation, as follows: seat the patient in a static armchair on the insulated platform. Make metallic connection to the top of the Oudin resonator by placing a large metal sheet (about 5 x 20



1—1. Connection from terminals of static to Leyden jars; 2. Connection from solenoid to vacuum electrode; 3. Connection from Tesla post to ground; 4. Connection from ground to small metal plate in contact with patient.

inches), against the bare skin of the patient's back, and connecting this by wire to the Oudin resonator. A patient thus connected is charged and discharged with every pulsation of this pulsatory discharge.

If we approach our clenched fist to within three to six inches of a patient thus connected, we will see a spray discharge emanating from the patient to our fist, or we may draw sparks from the patient's body with our knuckles.

This method has succeeded in aborting an attack of whooping-cough in three cases, the immediate effect being profuse perspiration, removal of fever, and production of sleep, followed by lessening of cough and vomiting.

The next step is that where we make a conductor of the body for the direct passage of the current. This is accomplished as follows: Have the patient seated in a small plain chair on the insulated platform. Fasten a metal plate to his back, or opposite any part we wish to treat, ground this plate and the Tesla, and attach the glass vacuum electrode to the top of the Oudin resonator after having first placed this electrode to the seat of disease.

This method has been successfully employed in pulmonary tuberculosis in ten cases.

We can also use the latter method for cataphoresis by either painting the medicament on the part or using a special electrode for the purpose.

It would seem that much of the therapeutic value of high-frequency currents is due to the actinic property of its spark and spray discharge, and in its power to produce chemical changes in the tissues, as is evidenced by the very great increase of the solid constituents of the urine, by the increase of the excretion CO_2 , as well as the positive increase in heat production and increased activity of the sweat glands.

High-frequency currents probably owe their remedial effects, in infectious diseases, largely to their power to check toxins, improve nutrition, and (when used in not too great amperage) to strengthen the natural defenses of the body.

148 West Seventieth Street, New York.

Discussion.

Dr. Edward C. Titus, New York City: The close attention to the detail work presented to us by Dr. De Kraft is worthy of great commendation. The results in the class of cases which he has shown us we get with no other modalities. His treatment of joint cases is certainly a revelation to me. For a long time I have treated cases of synovitis with the static wave-current followed by sparks which has given me good results. According to Dr. De Kraft's method we are able to obtain these results in a shorter period of time, and his claims are certainly worthy of our investigation. I think if we understand and properly apply these different modalities we shall find their therapeutic value to exceed that of medicinal remedies. I congratulate Dr. De Kraft upon the type of his paper.

Dr. Barshinger: I have made some experiments that seem to prove exclusively to my mind that the high-frequency current does penetrate the tissues. This may be demonstrated by apply-

ing the electrode to the patient's chest; having him open his mouth, when you can draw a spark from the tongue. This would seem to show that there must be a penetration of the tissues.

Dr. William Benham Snow: While I feel that the electricity does penetrate under the conditions named, I would like to disabuse Dr. Barshinger's mind, for this is not proven by the production of the spark referred to; for, when a body is brought near enough for a spark to pass from an external source, it will be by conduction from an external capacity and no evidence that under other conditions the body is charged or that the current penetrates.

Dr. Edward C. Titus, New York City: I might call attention to the particular source of energy that Dr. DeKraft has described. We hear so much about high-frequency currents, but I think the term has become a misnomer, for it is not the high-frequency current, as it is commonly stated, that produces the penetrating effects, but the low frequency. I believe it was thoroughly stated at the last meeting of this Association that it was the currents of low frequency and high potential which possessed the greater penetrating qualities, that when we increased the frequency of the currents from different sources of energy above a certain standard, they did not penetrate the surface of the body, but passed over the skin.

The current generated from the coil has a local action. With the current from the static machine we get penetration and contraction. One action is chemical and the other is physical. From the coil we get local chemical action; from the static machine we get deep-seated physical contraction.

Dr. Donaldson: I thank Dr. De Kraft for enlightening my ignorance in this matter. I began the use of the Tesla coil in connection with my static machine with skepticism. I could not find any type of construction that was suited to the different apparatus in use, and I confess that I began using it without any expectation of real service. A very few cases have taught me that there is a real benefit from it, more particularly in those types of cases of mild pleuritic adhesions with slight temperature and some cough. These cases were very speedily relieved after I had attempted to relieve them by medical means and had failed. I did not understand that the author carried out his experiments with the Tesla coil, but with the Oudin resonator.

Dr. De Kraft (closes): I use the first method employed in the use of the high-frequency currents from the coil. I use it only with the D'Arsonval current.

The question of penetration is largely a matter of method. If we use simply the spark and spray of the Oudin current our effect is largely surface. In that method whereby we

make the body a conductor of the Oudin current, where we ground the metal plate opposite the point we treat, it can be shown that the current passes in a direct line from the electrode to the metal plate. If the connection is proper under these conditions, you cannot draw any spark from any part of the body within an inch of the electrode. Close to the electrode you can draw a little current off, but the farther off, the less current you can get until two or three inches from the electrode you cannot draw off anything. If we take the chain attached to the metal plate and lift it off from the point where it is grounded, so that a spark of an inch or two will pass, we can get muscular contractions throughout the body. Especially is this so if that metal plate is over the back.



THE USES OF STATIC ELECTRICITY IN THE TREATMENT OF GASTRIC DISORDERS.*

BY GEO. D. BOND, M. D., HILLSBORO, TEXAS.

We have been told that there is nothing new under the sun, and that there is anything original in what this paper may contain, there may be much doubt, but I shall hope that it may add something to our understanding of what already has been done.

The stomach bears the first brunt of that which goes to the bodily maintenance, and as a consequence errors in food and drink work their first havoc in this organ. Indigestion is one of the great characteristics of American life, and indirectly the primal factor in the invasion of the body by disease. Even zymotic disease cannot easily enter a body that is normally nourished, and its entrance through a perfectly healthy stomach is almost an impossibility. The average American has inherited from his pioneer ancestors the idea that he can eat and drink anything, in any way, at any time without hurt, but unfortunately he has failed to inherit that kind of stomach. These ancestors of ours were the greatest human animals known to civilization and many of them became veritable intellectual giants, some of which greatness our people still enjoy. Surrounded by the influence of unspoiled nature in their habits and habitations, even the heavy drinking and eating of their British forefathers did not even bring to them the English dullness. One good plunge into a clear, cool pool of spring water would restore the wasted nature of a night's debauch. But we have become so far removed from such benign influence, that unless we mend our ways or in some way meet this exigency our greatness will soon begin to fade. I should feel very grateful if any humble effort of mine might help, in any small way, to stay such tendency. What we cannot prevent, we must cure if we can, and if we cannot cure, give what relief we can.

Failure to digest the food ingested usually results in acid fermentation, producing irritation as well as inflation; the gaseous distention resulting in much tension on the gastric wall.

* Read at the Sixteenth Annual Meeting of the American Electro-therapeutic Association at Philadelphia, September 18, 1906.

When this condition has continued intermittently for many days or weeks or perhaps months or years, after many efforts of outraged Nature to restore the natural function, only to suffer further outrage, there are necessarily many organic changes in the stomach walls with its intricate structure of nerves, blood vessels and glands and its peculiar arrangement of muscular fibers submerged by *débris* and stretched until there is no semblance of their normal relation. Loss of tone, with its inevitable result, dilatation, is a most natural sequence. I say inevitable advisedly because it has been proven repeatedly that nearly every case of prolonged gastric indigestion results in dilatation. Most investigation along this line has been recent, but it seems to me that the findings are altogether rational and convincing. The measurements were made both by the X-ray and gaseous distention. Most of this has been done by German investigators but what has been done, along this line, in this country has resulted in the same findings. These investigations show, that the stomach is not only dilated, but that it is out of normal relation with other abdominal organs, and that its fundus and pyloric ends are very much out of their natural relations. While the pyloric end retains its relative position, the fundus stretches and gravitates out of all normal relations, leaving a helpless bag unable to relieve itself. Take the anatomy of this organ and we will see why this occurs. The circular muscular fibers which give the stomach its expulsive force and regulate the ejection of food into the duodenum have very little strength or force except in the pyloric portion. Consequently the fundus has no such resistance against dilatation or the loss of its position; nor can it when once dilated regain its natural size or position, without something can be done beyond anything that has ever yet been done by medicine or surgery. The discovery of the above-mentioned facts explains the unsatisfactory results heretofore attained in the treatment of dyspeptic conditions.

The test breakfast followed by the institution of scientific feeding, lavage, pepsin, or hydrochloric acid, have usually resulted in disappointment, because dilatation and misplacement were left out of the equation, or there was no adequate measure to meet this condition. Lavage would clean out the food mass and give temporary relief, pepsin and hydrochloric acid would bring temporary help to the overworked

pylorus, but the pendant fundus remained. The surgeon can with a gastro-enterostomy give drainage, but this can restore no function; neither can it restore normal size or position. Nothing has ever done this as far as I have been able to discover except electricity. Faradism with internal gastric electrode has accomplished some good, but most that has been done was by the current of the static machine, although very little attention has been given the subject by electro-theraputists. The Morton wave-current will bring very decided results in many of these cases, but I have been able to get very much more uniform results from a Leyden jar current, a current that might be called a Leyden jar modification of the Morton wave. The connections are the same except the wire connecting the patient with the machine is attached to the outside of a large Leyden jar, the patient seated on the insulated platform: by this arrangement the spark-gap can be regulated as in the Morton wave-current, while the largest practicable Leyden jar can be used without discomfort to the patient. I use one or more jars, connecting them either in series or parallel. In most cases one jar is sufficient, but in some I have been obliged to use six before I could get the desired results. In this way, it is self-evident, the volume can be materially increased, and also the potential at will, while by virtue of the insulated platform body electrification and the general tonic effects are still retained. Evidence of this is given by the waving hair and the fact that it causes the stomach to empty its contents, as well as the decided general stimulation felt by the patient, and the positive evidence of its influence upon the circulation. All of these effects are of easy demonstration.

This general electrification is not so evident as in the current taken direct from the prime conductor, but the increase of volume and potential is evident and actual in its local effects. There are alternating contraction and relaxation of the stomach with each charge and discharge, and both in its entrance and exit life and energy seem to be given to this organ.

A block tin or other soft metal electrode should be placed over the region of the stomach, so that the current in seeking entrance into the moist tissues will pass through the stomach in full concentration with each charge and discharge. This effect is much more marked than when the patient is removed from the insulated platform and the current is allowed to constantly

leak into the floor, causing uncomfortable contractions of the abdominal and leg muscles. When the patient is insulated, the current seems to have almost selective action on the musculature of the stomach, while no amount of Leyden jar condensation causes unpleasant muscular contraction, external or internal. It is, however, a valuable current whenever intense local action is required.

The Morton wave-current is more difficult of procurement and regulation than any other static modality, but, without regard to the condition of the machine or the state of the weather, this current is to be had with almost any desired spark-gap, the frequency of which can always be regulated. This enables us to get rhythmic action of cell life and at the same time perfect rhythmic contraction and relaxations of the stomach musculature, and of a frequency to approximate its normal movements. In cases of unusual atony, frequency of movement over the normal should be increased as in artificial respiration. If there is only a condition of dilatation and the consequent congestion and stasis, the contents are discharged quickly without discomfort, through the pyloric opening, but if there is gastric catarrh or any degree of pyloric stenosis regurgitation nearly always occurs as soon as the charging and discharging oscillations commence. This fact makes it necessary that treatments should not be given until several hours after the ingestion of food.

In the past three years I have treated thirty-five cases of stomach disorder by static electricity, using the modality mentioned, and the results have been gratifying in the extreme. Most of these had dilated stomachs as shown by actual measurements, and all had the classic symptoms of gastric insufficiency.

Duration in a few cases was only thirty to sixty days to several months, while most cases treated were of several years' continuance, and there were several with a duration of from fifteen to twenty years. Many showed improvement from the first treatment, none failed of some relief by the third treatment, nearly all felt decided improvement during the first week and many of them required much argument to convince them that further treatment was necessary. Five discontinued treatment, after satisfactory improvement, before permanent results were obtained. Five others failed to get more than temporary relief, these being cases of pyloric obstruction, due probably

to cancerous growth. The remaining twenty-five were symptomatically cured, and seventeen of these who have been kept under observation from four to thirty months have continued well without further treatment. Nearly all of my cases were taken for treatment, at a stated sum, to be treated as long as any treatment was required and would likely have reported if there had been any relapse. All of these cases were treated nearly exclusively with the modified static wave-current except in the five failures I used also the Morton wave-current and the static induced, but was able to give more relief with the X-ray than by any of the static modalities. For this reason, more than any other, I believe these are cancer cases, the pain of which is usually relieved by this peculiar manifestation of electrical energy. I will report in detail only three cases, which are types of the several variations of stomach insufficiency treated by this current.

First Case.—Male, age forty-three. This case was one of my first experiences in static treatment. He had been my patient for ten years, and in this time he had suffered frequent attacks of severe colic, accompanied by copious vomiting, confining him to the bed for three to fifteen days, the pain requiring the use of so many hypodermics that I had serious fears that a habit would be formed. These attacks grew more frequent and severe and resulted in the vomiting of large quantities of blood. The last attack came near being fatal from the shock and loss of blood. At this time one of the leading surgeons of Texas was called in consultation to decide if the knife could give any relief. The result of the consultation was the opinion that he was suffering from dilated stomach, with some trouble causing corrosion and that the only relief to be given was a gastro-enterostomy, but as the urgent symptoms were then under control, the operation was postponed until there was some revival of strength. Having just returned from my first course in electro-therapeutics, I suggested electricity and had the consent of the consultant to try it while waiting for the operation. After about one week's time I had him brought to my office in a carriage. The pain which had continued, though not so severe, was relieved and he was much better able to return to the office the next day. Daily treatments were continued for two months, and then on alternate days for three months, with only one attack (lasting three days) that

prevented his attendance at the office. After this, treatments were given longer and longer apart; returning whenever he felt any slight symptoms of trouble, until one year ago, since which time he has not been treated and has continued seemingly well. The operation was found unnecessary. The current used—the one always to be given preference in cases of this kind—was the modification of the Morton wave-current (a large electrode over the stomach, connecting the patient with the outside of a Leyden jar, instead of directly from the prime conductor, as is done in the original Morton wave-current). The report of this case so far is copied from a report made in a paper, on the uses of static electricity, read by me before the Texas Central Medical Association July 11 last. Since then this man has suffered a severe hemorrhage, following a thirty days' alcohol debauch, but there was no pain or evidence of dilatation. The loss of blood and alcoholic delirium came near destroying him, but he made a final recovery without any further evidence of former trouble.

Second Case.—Female, age twelve. Daughter of a well-to-do farmer, family history good; had suffered from infancy with vomiting of food immediately after ingestion, and almost invariably. The statement from the patient and parents was that she seemed to reject everything taken into the stomach. She was anemic, emaciated, weak, nervous, and irritable. There was no dilatation and instead of an atonic condition there was hypersensitiveness. This was a case for the mildest form of the modified wave-current, with oscillations rapid enough to invoke inhibition until there was sufficient tolerance to permit its stimulant action. Vomiting did not occur after the first treatment and improvement was so continuous and effective, that in thirty days treatment was discontinued, although against my advice. She remained well for about thirty days when there was a complete relapse into the former condition. Treatment was resumed with results as at first and this time continued every day for thirty days, on alternate days for thirty days and twice weekly for another month, since which time, thirty months ago, there has been no return. I saw this girl about one month ago and she was a perfect picture of pretty adolescence. The inhibitory action of the deep massage effect of this current must have been a special factor in the results obtained in this case.

Third Case.—Female, aged twenty-five. Daughter of a minister, refined and intelligent and of a highly nervous organization. She had suffered for eighteen months from a severe and con-

tinuous nettle rash. There was no history of stomach disturbance except the skin symptoms. More or less general pruritus was always present, but the greatest distress occurred after retiring, when the urticarial wheals appeared with such persistence and severity, destroying sleep and producing such nervous excitation, that much bromide, chloral and drugs of like character had been taken. Fortunately no morphine had been used. If any diet beyond that of the lightest character was attempted, the condition was greatly aggravated. Her statement to me at her first visit was that she had not eaten anything for a week except tea and toasted crackers, and that this diet had only ameliorated the symptoms. There was some relief from the first treatment, but there was more or less evidence of the urticaria for eight days and there were slight recurrences after this for three weeks, since which time no symptoms of it have ever appeared. She was allowed after two weeks' treatment to eat anything she wished to and she did indulge in all ordinary diet. Treatments were given, with gradually extended intervals, for ten weeks. Twenty-eight months ago she was dismissed, and although her residence is now two thousand miles away, I have frequent and grateful messages of her continued good health.

After comparing the results from the use of this modality with others, and that after having many times made this comparison on the same patient, I am of necessity persuaded that this modality gives more uniformly good results than any other and that these results are primarily due to the intense local action of the one-pole Leyden jar current, producing deep massage effects and rhythmic action on the stomach and at the same time causing extreme but rhythmic movement in the cell life of all its tissue, thereby equalizing the circulation and increasing nutrition, relieving the neuro-muscular atony and probably restoring normal arrangements.

By support of function organic restoration is permitted, metabolism is encouraged until the natural forces are again enthroned for the attainment and perpetuation of life, health, and happiness.

Discussion.

Dr. Fred H. Morse, Boston: I do not think there is any one diseased condition that we, as general practitioners, confront as often as we do the conditions arising from, or complicated with, dilated stomachs. Our patients come to see us with headache, "pains under the shoulder blade," "gas in the stomach," and the usual terms that the laity apply to their bad feelings in the epigastrium, and we as physicians understand that many of their symptoms are due to auto-intoxication from the fermentation of food taken into the stomach. At the same time there is a train of symptoms that drugs do not affect and food

but indirectly creates. In such accurate diagnosis is more important than in almost any other functional condition. I feel that we have in electricity a means of controlling and in many instances curing these old cases of chronic gastritis, whether or not they are complicated with dilated stomachs. Stenosis of the pyloric end of the stomach and many other conditions that might call for surgery must be carefully excluded before we try to do too much with electricity. Assuming that the condition is purely that of dilated stomach with or without floating kidney, I think we can do much with electricity. The doctor has gone extensively into the use of the oscillatory wave-current. I think in this condition we have almost invariably headaches, and while this is due to auto-intoxication and to pressure on the nerve centers for which instructions as to diet should be carried out to a nicety, electricity should be employed in a certain definite manner to bring out the results or we will fail. We should have a definite idea of what we wish to obtain rather than to use one method, ask the patient how he liked it and the next day try another modality. I use galvanism through the stomach, having the positive pole on the back. I use a mild current of from 10 to 20 ma. for five to ten minutes and use a continuous current, interrupted. With this I can do more to improve the over-stretched and half-paralyzed stomach muscles than with any other form of electricity. Some of the apparatus have an attachment whereby we can regulate the number of interruptions per minute. In cases with thick abdominal walls we give not more than 75 to 150 interruptions per minute. In others where there is little resistance we could go up as high as 200 to 300. That can be easily measured on some of the dials. This is combined with proper vibration over the dorsal region with special reference to the left side from the fourth or fifth vertebra down to the twelfth. We have in this method a means of imparting a muscular tone to the wall of the stomach obtained by no other electrical modality. This is due to the internal polar action in connection with the effect upon the spinal nerve centers. In the beginning of treatment there is often excessive tenderness over these particular nerve centers. With the result anticipated the tenderness grows less, the patient complains less of fermentation and there is general improvement. The high-frequency static spark might be used in conjunction with this plan of treatment.

Dr. Sinclair Tousey, New York City: My own treatment for gastro-intestinal diseases has been chiefly with the high-frequency current and the X-rays. I call to mind one or two cases which illustrate the methods employed. One case was that of a lady, very nervous and high-strung, who when misfortune or cause of irritation occurred developed a colitis characterized by pain and sense of distention in the abdomen, fol-

lowed by a liquid movement. The high-frequency current, about 200 ma., stops one of the attacks immediately, and one or two treatments may be sufficient to get over the trouble without recourse to further methods until some source of nervous irritability occurs. Another case was that of a lady who had been suffering from something of the nature of colitis, having dysentery for four or five years, worse in the summer. Her brother, a prominent physician of New York, told me that she had twenty-five bloody movements every day and asked me whether high-frequency currents would benefit her. I tried the X-ray in very moderate doses of about ten minutes of the strength of 2 ma., placing the tube at a distance of ten inches from the skin. The high-frequency current was applied in the same way as in the other case. The woman went home, passed a comfortable night, and the following day had only one movement. I gave her ten treatments, three times a week, with complete cure. There has been no recurrence of the trouble during the three or four summers since.

Another case was that of a man with diagnosis of dilatation of the stomach. There was an enormous distention with gas and such ballooning of the abdomen that it seemed as if it must burst, accompanied by severe pain. A test breakfast and examination made by an expert showed that there was not dilatation of the stomach, but that it was of normal size and with normal function. The enormous dilatation shown in outline was manifestly that of the large intestine caused by some sort of obstruction, torsion, or stricture. With the high-frequency treatment the attacks became very infrequent.

For the atonic conditions with constipation I have been using what I call a synoidal current. This is a continuous current, which is gradually increased to 15 ma. with the negative pole on one side and the positive pole on the other side of the abdomen. By means of the rheostat the strength of the current is reduced to zero and then gradually increased to 15 ma. in the opposite direction. This goes back and forth without any sense of shock and with a pleasurable sensation to the patient, and it has proven to be wonderfully successful. I have tried the sensation with this current in my own hands and find that while I do not find any muscular shock the muscles are exercised, and by holding two electrodes in my hands for ten minutes I have the sensation of power as in exercising with heavy weights. A cane, for example, feels like a straw.

Dr. Henry Finkelppearl, Pittsburg, Pa.: I have been using both the high-frequency and the Morton wave-current, and I can say that the Morton wave-current gives better results than the glass vacuum electrode. The treatment is given every two or three days, and where the patient adheres to it faithfully we get good results in fifty per cent. of cases.

Dr. William Benham Snow: In my experience the contraction produced by any agent which will go deep enough to give rhythmical stimulation to the stomach muscle is effective in these cases. I believe that the modified wave-current described by Dr. Bond is a little more intense than the direct wave-current. I have demonstrated the promptness with which the stomach muscle can be contracted by the use of the static wave-current, in two cases of acute colic in which the stomach was greatly distended; in these the gas was wholly removed. I remember well the case of an old woman who came into my clinic at the New York Post-Graduate School and Hospital in 1900. She was sent from the Medical clinic with a great dilatation of the stomach which they were unable to relieve. In the short time we had at our disposal in the clinic to devote to individual cases we could only give the static spark. The gastroparesis was so marked that the stomach descended into the iliac region of the left side. Treated every other day for two weeks' time she was able to take an ordinary diet, whereas previously she had been unable to digest any but fluid diet. I feel that the doctor's method has its lessons, and though others may succeed with other currents, it cannot be anything but successful in dilated stomach, unless there are exceptional conditions present.

Dr. John H. Mudgett, Philadelphia: I have had some little experience with the Morton wave-current. In one case operated upon last year for appendicitis there was no trouble with the appendix, nor with the gall-bladder which I explored. The patient had no trouble for six months following the operation. I then used the Morton wave-current, and, as I believe, in all these cases we must not lose sight of common things by putting the patient on a diet which will improve the gastric tone and lessen gastric inflammation. We must consider not only the massage effect but the effect on the ganglion controlling the nerves of the stomach. We must improve the condition of the nerves, not only of the stomach, but those of the glands which secrete juices necessary for digestion.

Dr. Bond (closes): I had hoped there might be more discussion relative to the static current described. This is a current which seems to have received very little attention but which has great possibilities. I wish to mention especially the use of this modality in preference to the sinusoidal. You can restrict the rate of spark discharge absolutely to a slow spark approximating the natural movement of the stomach as you can with no other current that I know of. You can make it one or two per second, or one every two or three seconds. It is absolutely unlike the Morton wave-current in that respect. You have absolute control of the running of the machine and of the rate of discharge of the spark.

A PLEA FOR CONSERVATISM IN ELECTROTHERAPEUTICS, WITH REMARKS ON DOSAGE.*

BY A. D. ROCKWELL, A. M., M. D., NEW YORK,

Neurologist and Electro-therapist to the Flushing Hospital, etc.

Some time ago, the writer had occasion to visit the office of a physician who was thinking of abandoning the general practice of his profession and devoting himself to the use of electricity in medicine.

He was well equipped with static apparatus and high-frequency attachment, but with no apparatus for the administration of the direct and induced currents (galvanic and faradic).

His enthusiasm was unbounded. He had greatly benefited locomotor ataxia, reduced enlarged prostates, was always and quickly successful in all forms of rheumatism and neuritis and, among other marvels, uniformly cured his cases of arthritis deformans.

It occurred to me then, as it had occurred to me before, that some discussion along the lines indicated by the title of this paper would not be altogether without value.

Electricity in its several forms is undoubtedly here as a permanent addition to our methods of treatment. It has been compelled to push its way through much of indifference, sometimes of actual opposition, and it behooves those who are directly interested in an agent which has already served us well, not to hinder its progress by claiming for it more than it is capable of giving.

In surveying the current literature of electro-therapeutics, one cannot but be impressed with a certain lack of judicial fairness that prevails. This want of judicial candor works in a twofold way, very much according to the temperament and environment of the individual. On the one hand, the enthusiast becomes an altogether illogical pessimist and denies the efficacy of the agent that he has crudely tested. On the other, enthusiasm develops in the opposite direction, and overconfidence and overstatement characterize every public utterance or written report. The one encouraging feature in the development of

* Read before the Annual Meeting of American Electro-therapeutic Association, September 18, 1906.

electro-therapy is, that the more we know about physical methods, the more are we inclined to exercise rational judgment in testing them.

We are yet very far from perfection in this direction, and medical literature teems with ill-considered and foolish statements, but we have only to turn to the literature of the past and be comforted. We there read, that with the very imperfect means at command, among the diseases that were successfully treated by electricity, were blindness, consumption, deafness, epilepsy, gravel, King's evil, agues, etc. At the present day there are few so rash as to claim that much can be done through electricity for the conditions just named, although occasionally we find some over-ardent disciples exploiting the use of electricity and other physical methods in the ataxias, etc. In such cases it is charitable to ascribe these statements of cures, in the majority of instances to misconception, to a faulty diagnostic sense rather than to willful misrepresentation. It is so easy, if one's experience is limited, to mistake a functional condition for one that is structural, especially when the milder strongly simulates the graver disease as is so often the case. A case in point occurs to me that I have frequently alluded to and which I am glad to record, for it seems to me to teach a useful lesson. Some twenty years ago a brilliant young clergyman from a distant city consulted me for pronounced locomotor ataxia, i. e., so pronounced by the physician to whom he first applied and who was then treating him for that condition.

After a careful examination, I felt justified in saying to the patient that so far as locomotor ataxia was concerned he might live a hundred years.

To-day, this patient occupies one of the foremost pulpits in the city of New York, and is among its most distinguished representatives.

If it had not been his good fortune to be undeceived as to his actual condition, undoubtedly to the means that were being used in his case would have been attributed the cure of a true case of locomotor ataxia.

Of far more importance, however, than a possible therapeutic misconception, was the damage to the morale, the blow to the resisting powers of the system, occasioned by the unjustifiable mistake in diagnosis in this case.

Now, it is no very difficult matter, it seems to me, to decide

in any given case whether electricity is indicated or contra-indicated, and if indicated what manifestation is most likely to yield results. To indicate the measure of benefit to be expected is quite another matter.

Idiosyncrasies cary, and it is difficult to accurately gauge the extent or severity of existent pathological conditions. Fortunately, there are comparatively few contraindications for the use of electricity in chronic conditions of disease. With a good working knowledge of physics and a skilled technique, if it does no good, it need do no harm, but lacking these essentials, it is more than likely that acutely painful and hyperesthetic conditions will become aggravated with more or less permanent injury. The first broad general principle to be considered in the therapeutics of electricity, using this term in its generic sense without reference to any special modality, is its influence over nutrition, and that these nutritive effects, which are secondary, are far more valuable than its primary effects, be they stimulating or sedative. For let it not be forgotten that this agent is double-edged and cuts both ways. It may act as a stimulant or an ugly irritant, or in many an hyperesthetic condition of the nervous system, as a prompt and unequaled sedative.

It is simply a question of technique and differentiation in the choice of modalities.

If one is to be master of an efficient technique, without which the use of electricity in medicine will result in a fruitless quest, he must be familiar both with its physics and physiology.

Above all he must study Ohm's law, a law competent to explain all the phenomena with which it has to do, and which if clearly and generally understood would do much to stem the unfortunate and increasing disregard of that most important manifestation of the continuous current, commonly termed the galvanic.

Many of the more recent workers in the field of electro-therapy seem to be in entire ignorance and some of the older ones to have quite forgotten that in this manifestation of energy we have a kind of electricity, so to speak, for which in certain conditions no other kind can be substituted.

Familiar examples are its direct effects upon inflammatory exudates, and upon the central nervous system, especially the brain.

These effects are based upon chemo-physical action and both experiment and experience teach that in the action of the continuous current of magnitude alone do we get an effective and satisfactory electrolytic and absorptive effect.

Reverting to the fundamental idea of the nutritional effects of electricity upon which in great measure must be based its utility in medicine, I would emphasize the fact that its greatest value lies in its general, rather than in its local administration.

When one local pathological condition is benefited by a purely local application, many constitutional conditions with their varied localized symptoms are benefited by general applications.

Both analogy and experience teach that the full nutritional effects of electricity can be obtained only as it affects either directly or reflexly the whole central and peripheral nervous system, including the entire muscular and circulatory system under their control. It acts therefore not merely as a stimulant or a sedative. If this were so the cause of electro-therapeutics would have little vitality. Its well attested action is nutritive and constitutional as well as local. As Niemeyer recognized long ago, referring, however, only to the constant current, "we have in it a means more powerful than any other in modifying the nutritive conditions of parts that are deeply seated." Whatever the modality employed, in varying degree, the disposition and capacity for both mental and physical effort is undoubtedly increased by these general applications. They act indeed very much as do other tonic remedies, whether medicinal or hygienic. In selected cases there follows improvement in sleep, a more vigorous digestion with increased power of assimilation.

The rationale of these results depends undoubtedly upon the power of electricity to modify physiological function, either by an increase, a diminution, or some modification of quality.

To no one method of general application alone can be ascribed the power to produce these results.

With the requisite equipment we have at our command, high-frequency currents with the methods of auto-conduction and auto-condensation, static electricity with its various methods of application, the galvanic current with its central and generalized methods, and last but not least the older and well attested, but now neglected method of general faradization.

While fully recognizing and carefully testing every new process in the evolution of electro-therapeutics, there are two

strong and sufficient reasons why I would urge a recrudescence of general faradization.

First. Because in a long and varied experience I have found that general faradization has an individual merit, at least equal to any other of the general methods and not unfrequently a merit and an effect all its own.

It should not supersede other methods any more than other methods should supersede it or each other; but it is a fact of common experience that in the domain of internal or external medication and in hygiene a change of treatment is often of the greatest service. In its relation to climate this principle is especially marked, a change from one atmospheric condition to another often being of decided advantage to the patient. In the treatment of long-standing cases by electricity I have seen this fact illustrated hundreds of times, where under one modality and one method of administration, a case seems to hang fire or halt in its progress, under another the case hastens to recovery.

It thus becomes evident that to do the best work, one should be well equipped, and he who has abandoned general faradization or who knows not its technique is by so much the poorer in the therapeutic possibilities of the agent employed.

Admitting the value of general faradization, another argument for its study and more general use is the slight expense even of the very best apparatus.

It certainly requires more skill to administer a satisfactory application of general faradization than that required by most of the other methods and to this conjoined to the partial disrobing of the patient, and the time and labor required of the physician, is to be ascribed, in part at least, this neglect of a most important part of our art.

Let no one then deny the utility of general faradization until he has had adequate practical experience in its use; indeed after such experience no one, I venture to assert, will care to do this.

(To be concluded.)

Editorial.

THE METHOD EMPLOYED OF GREATEST IMPORTANCE IN PHYSICAL THERAPEUTICS.

THE reader of medical literature which considers the employment of physical agents can but be impressed by the diversity of views and varying technique employed in therapeutics. The points of view are too often empirical, which largely explains this diversity.

The first prerequisite for success in the employment of physical agents, is not the knowledge of how to treat conditions empirically, but first the knowledge of the condition—a correct diagnosis; and second, the choice of the rational agent which is designed in intelligent hands to best remove the condition.

Far too many operators are prejudiced in favor of modalities without reference to their action upon normal or diseased tissues, and far too often the field of action is clouded by an indefinite knowledge of the correct *modus operandi* of employing such measures. The man who makes a correct diagnosis and understands the peculiar actions of the various modalities and employs them with the full realization of the conditions to be overcome, is certain to acquire a technique which will be usually successful; whereas, the operator who allows himself to fall into a rut, and expects to accomplish everything with one electrical current or modality, or even narrows himself to the employment of a few of the recognized methods, and does not progress, will deprive his patient of opportunities which advanced knowledge in the use of these agents entitles him to. It has often been said by patients that they "had tried electricity, and it failed," and physicians who are told by patients that they wish to try electricity, mechanical vibration, or some other measure, venture to administer it to them, when in reality they know little or nothing about the methods of employing any of them. This sort of practitioner brings the employment of physical agents into disrepute. He also becomes disgusted with the use of them himself.

It requires as much skill, if not more, as well as a knowledge of anatomy and pathology, to succeed with the use of physical measures as it does to succeed with the use of the knife. When the medical profession and the laity appreciate this fact, or bet-

ter say when the laity appreciates this fact, it will be necessary for physicians who employ these agents, to understand the best methods, and to employ the necessary apparatus with intelligence. Then, and not till then, will the value of these measures be generally appreciated by the profession at large, as surgery is, in the cases to which they are adapted.

* * *

THE DIAGNOSIS AND TREATMENT OF NEURITIS.

THERE is probably no type of disease in which greater errors exist both in point of diagnosis and treatment, than in the various forms of regional neuritis.

When a patient reports that he was blistered along the course of the sciatic nerve or particularly over the regions of pain, or had been given large doses of salicylates or of iodide of potash, for the treatment of sciatica, those who realize that a neuritis is a local lesion usually confined to a small portion of the nerve, with pain as a symptom, can have little respect for such methods.

Neuritis is an inflammatory process usually confined to a small portion of the nerve trunk. The pain, occurring at the periphery, is but an index of the lesion without reference to location. Neuralgia is a name for pain—an evasion of the point at issue.

The first step for a physician to pursue who would successfully relieve this pain, is to locate the lesion, and then properly treat it, either by removing the cause, as an exostosis, or by relieving a local congestion. The diagnosis of the region of the lesion may be easily made by passing a vibratode having a smooth surface in connection with the vibrator in fairly rapid motion along the course of the nerve, or by applying, with a spark director along the same course, short static sparks, either of which will elicit marked or great pain when applied over the site of the lesion. When located, treatment will not be directed by the thinking man to the regions of pain at the periphery, but directly to the lesion.

No method will so promptly, certainly, and successfully relieve and cure a local neuritis as one which disperses stasis, thereby re-establishing circulation throughout the engorged tissue. For that purpose the local administration of the static spark directly on the site of the lesion, contracting the engorged tissue, forcing out the infiltrate and restoring tone to the muscular coats of the vascular walls, or the milder static wave-current or a vacuum tube taken directly from the static machine when adapted to the condition will accomplish the same purpose in most cases, and promptly effect a cure. The same rule applies in the treatment of all early cases of uncomplicated neuritis; difficulty

arising only in cases in which the lesion is located in the thorax, in the pelvis, or when the affected nerve is situated in a bony canal. In such cases the systematic employment of the Roentgen ray, together with the use of long static sparks and mechanical vibration, accomplishes the most, but are not promptly effective except when applied in the very early stages of the condition.

* * *

A CONFERENCE TO DEVISE WAYS AND MEANS TO PROTECT PUBLIC HEALTH AND MORALS.

A CONFERENCE will be held at the Hudson Theatre in the city of New York, November 15, 1906, which delegates from the American Electro-Therapeutic Association have been invited and appointed to attend. The American Medical Association, The Medical Society of the County of New York, The Academy of Medicine, and various other medical, educational, and philanthropic associations have consented to send delegates. The object of the meeting is to devise ways and means to suppress quackery and charlatanism, and abate the tendency of the present practice whereby the manufacturers of drugs and food substances, adulterated and harmful in character, are being upheld by the newspapers which contain the alluring and false advertisements of this class of dishonest venders.

The movement is most commendable and should receive the earnest co-operation of the medical profession and an intelligent public. In dealing with this subject the medical profession have a duty to perform, together with the medical journals of the country, which is of the utmost importance. There are a large number of harmful proprietary medicines that are put up and introduced under recommendation of medical men who often give little thought or attention to the characteristics and qualities of the drugs contained; heeding only the claim of the manufacturers. These proprietaries come properly under the heading of patent medicines; the only difference being the expediency of reaching the public through the professional medium—the censorship as it were of the medical profession. The responsibility for the introduction into the homes of these drugs, with their subsequent dire effects, rests with members of the profession. It is deplorable that physicians should be abettors, *particeps criminis*, with a commercialism so questionable. That there are a few creditable proprietary pharmaceutical preparations deserving of the confidence and patronage of the profession is granted; but that the number is small, must be conceded by all well-informed and conscientious members of the profession.

Progress in Physical Therapeutics.

GYNECOLOGY AND METALLIC ELECTROLYSIS.

BY G. BETTON MASSEY, M. D.

Electricity in Gynecology.

To those who have borne the burden of the affirmative side in the eighteen-year-old discussion concerning the value of electricity in gynecology the perusal of a paper by Chauncey D. Palmer, of Cincinnati (Cincinnati Lancet-Clinic, April 14, 1906) is most interesting and agreeable. Its optimistic, yet conservative, tone is in excellent contrast to the grudging recognition of electric modalities by some recent writers, who damn them with faint praise, on one hand, and to the unwholesome praise of the uninformed, on the other. The full force of this readable article is lost if one does not know that Dr. Palmer is an able gynecological surgeon, and thus peculiarly well adapted to apply a discriminating judgment to the questions at issue. That the paper was originally read before the American Gynecological Society, that stronghold of sharp steel, is a no less interesting fact than the personality of the writer.

This paper lends itself poorly to abridgment in the space at my disposal, for it is full of clear-cut indications for treatment and explicit directions for the same. Covering a broad subject in the compass of a journal article, one is tempted to expand rather than abstract it. Doing neither, I shall merely hang upon it a few thoughts of my own.

And one thought that comes unbidden is the mental spectacle of two classes of medical men who should be shamed into greater mental acuity by what this surgeon says of the value of simple induction currents, applied with knowledge and discrimination, in certain common circulatory and subacute inflammatory pelvic affections.

One class, with a high sense of rectitude, hurries these patients to the knife specialist when the best interests of the patient would be subserved if he procured a good "faradic" battery and mastered the simple details of treatment himself. The other class, consisting of young men working up a surgical practice in a small town or city, and lacking the finer grades of conscience, will themselves employ major surgical procedures with astonishing frequency in an incredibly small gynecologic clientèle.

Any kind of induction battery in the hands of an earnest man is better than either attitude, but the question occurs to the

editor whether this current is justly treated if imperfect coils be employed. Dr. Palmer indicates with much precision the relative value of the primary and secondary coils in specific conditions. I fear that much carelessness prevails among recent manufacturers of even pretentious cabinets as to the length and size of their coils. The purchaser should insist on having the standard coils recommended by a committee of the American Electro-Therapeutic Association some years ago.

The question also arises whether the newer forms of induction currents, the vacuum-tube currents and the wave-current, will be equally effective in these pelvic motor and vascular derangements. They should be tried. Personally, I feel doubtful if they will be as valuable as those derived from a first-class coil with a good interrupter.

These reflections refer to but a small portion of the contents of this paper, which deals largely with constant-current applications as well in many well defined conditions. A good word is said of electricity in fibroids, if restricted to the interstitial variety. For pelvic exudates the phoretic diffusion of potassium iodide solution is advised from both the vaginal and abdominal electrodes. As we understand it now, it is probable that simple anaphoric diffusion from a negative pole in the vagina would be better, the abdominal anode being the ordinary clay or kaolin pad.

After Results in the Cataphoric Treatment of Cancer.

Those present at the demonstrations given at the Oncologic Hospital during the recent meeting of the Association in Philadelphia were shown some old patients in whom excellent results existed, a year or eighteen months after treatment. By inadvertence, three patients who had come specially to the hospital to show themselves were not seen by more than one or two of those present. One of these was a young woman whose case was reported in these pages in the October, 1904, number.* The case was one of sarcoma of the sacrum, operated upon by a cataphoric Kraske operation in October, 1903. She is in perfect health, with the sinus about closed spontaneously, after three years.

A second case was that of a carcinoma of the rectum in a lady, reported at page 258, "Conservative Gynecology and Electro-Therapeutics," Fourth Edition. She remains well after two years and four months.

A third case was that of sarcoma of the upper maxilla in a man, treated by one major and many minor applications in 1897 and 1898. His health is perfect after nine years, with a healthy sinus leading into the antrum.

* See also "Conserv. Gynecol. and Electro-ther.," 4th. ed., pp. 252-256, Figs. 80, 81, 82.

RADIOGRAPHY.

EDITED BY HERMAN GRAD, M. D.

A Clinical Study of Gastropotosis, with Special Reference to the Value of the Bismuth Skiagraph in Determining the Topography of the Gastro-Intestinal Tract. By Charles B. Worden, A. B., M. D., University of Pennsylvania Medical Bulletin for August, 1906.

The report was based upon the study of forty cases presenting gastric or gastro-intestinal symptoms, from the Clinic for Diseases of the Stomach and Intestines at the Philadelphia Polyclinic Hospital, in the study of which particular stress was laid upon outlining the stomach to discover its shape and position. The X-ray pictures were taken in each case by Dr. Henry K. Pancoast. The following technique was observed: "Bismuth subnitrate held in suspension in mucilage of acacia was either poured into the stomach through the stomach tube, or swallowed by the patient, principally the latter method. The bulk of the bismuth-acacia mixture varied from four to six ounces and the amount of bismuth varied from one to four ounces. The skiagraphs were taken immediately after the bismuth was swallowed with the patient in a standing position, the plate in contact with the anterior abdominal wall. The picture was taken during full inspiration for from 8 to 15 seconds. It is advisable to siphon the mixture from the stomach; for though in some cases as much as four ounces was left in the stomach without unpleasant symptoms, six cases showed symptoms of poisoning. For the purpose of showing the lower border of the stomach, six ounces of the emulsion is sufficient. It is demonstrated by this method that the stomach and intestines can be studied more accurately than has heretofore been possible. The esophagus can be studied for stricture, dilatation, or sacculatation; the cardia for stricture and the size, shape, position, and the smoothness of its wall determined. A complete study of the stomach can be made, and of great importance is the clearness with which the upper curvature and the pylorus are shown in the skiagraphs. Regularity of the stomach wall can be observed and variations from the normal noted. In one case it was possible to diagnose a tumor invading the stomach wall by the irregularities of the lower border. A table is given showing the results of examination in forty cases. In thirty-nine gastropotosis was present; in thirty-nine dilatation of the stomach—in some instances without gastropotosis; in thirteen cases the pylorus was low, and in twenty-five cases kinking was present. In nineteen cases, a prolapse in the stomach extended into the pelvis.

The writer reports a number of cases showing various varie-

ties of conditions with skiagraphs, and concludes substantially as follows. The X-ray pictures of the stomach and intestines for diagnostic purposes excel by far any other method. To the surgeon they are of the greatest value, the operations being undertaken with far more confidence. The permanency of the records examined by skiagraph, and the accurate showing of the position of the stomach and intestines during their treatment add to the value of the method. Skiagraphs have proved of value also, in the diagnosis of stricture, dilatation, and sacculatation of the esophagus; of dilatation, prolapse, hour-glass stomach, and cancer of the stomach; of stricture, dilatation, and tumors of the intestines; and of prolapse of the colon and sigmoid.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

The Treatment of Lupus and Chronic Ulcer by Radiotherapy.
By E. S. Hunt, M. D., The Clinique.

The writer discusses in this paper the physics of the tube and ray to some extent. He considers that the distance of the tube from ulcerated surfaces varies in different individuals as well as the varied conditions treated. He thinks if the tissues around the original lesion are badly swollen the distance should be increased, but exposure should be longer. Some physicians have made the rule of one minute exposure to each inch distance from the surface to be treated. He thinks the rule, however, should not be adhered to at all times. He thinks the susceptibility of patients varies to a remarkable degree. He also calls attention to Snow's warning of the cumulative action of the rays. Some patients show marked improvement after the first or second treatment, while others take from twelve to fifteen. He considers light doses gradually increased till a slight erythema is produced. Professor Snow suggests that a safe rule to follow is to make exposures of ten minutes when using a static machine and from five to seven when using a coil, actively energized ten or twelve inches from the patient. He finds his treatment varies with different individuals with the induction of the initial dermatitis after from five to thirty exposures.

He reports a few cases, No. 1 being, lady, aged fifty-five, married. In 1893 while visiting New York noticed small kernel on the upper lip on the right side just under the nose. In six weeks' time it was as large as a dime. In three months it had enlarged to the size of a half-dollar and later the whole face and forehead became involved. She had many and various kinds of treatment until April, 1904, when she came to see the author, at which time her whole face resembled a dark, red nevus. The forehead was covered with dirty, yellowish scales

and several ulcers that would crust over, which when the crust dropped off left the ulcer larger than before. Both sides of the face were in same condition, while a large ulcer covered the left side of the nose extending out on the cheek, and had also eaten into the eyelid. He began to treat the case, which was diagnosed to be lupus vulgaris, in April, 1904. He began the treatment with a medium vacuum tube placed eight inches from the ulcerated surface with an exposure of ten minutes every third day, which was gradually increased to thirty minutes' duration. Ten treatments were given before any perceptible change was noticed. Then improvement began. On two different occasions she suffered relapses, which discouraged her, but she persevered with the treatment and was dismissed in September completely well, and so far there has been no relapse.

Case No. 2. A blacksmith came to the office with an ulcer on his face, as large as a half-dollar, of two years' standing. It began at the inner canthus of the right eye and extended out over the cheek and the right eye also over the right side and septum of the nose, the bones of which were denuded. This case of lupus had been treated for two years without results. He began treatment in November, 1903. He was cured with eighteen treatments and only a very slight scar was left on the nose. Up to the present time there has been no return.

He has been using the X-ray in the treatment of ulcers of the legs and arms with gratifying results.

The Roentgen Rays in General Practice. By H. Rundle Nelson, M. D. In Dominion Medical Monthly.

He considers the X-rays a powerful agent for good or bad in the treatment of many conditions. He does not advocate the indiscriminate use of the rays but considers, that in ringworm, favus, sycosis, eczema (both dry and weeping), acne, pruritus, and many other conditions it is of undoubted benefit. He calls attention to Sabouraud and Bordier of Paris, who by means of certain sensitive pastilles regulate dosage and are able to cure cases by one massive dose at one treatment. Sabouraud's statistics in Paris have risen from 110 cures per annum by old methods to 504 and the average duration from twenty-seven months' treatment to six weeks.

He considers the X-rays in cancer, while not a specific, certainly of undoubted curative power, and its ability to allay pain and arrest discharge is most positive. He thinks sarcoma yields more readily than carcinoma. Epithelioma he considers very amenable to this form of treatment, success depending largely upon the technique of the operator. Rodent ulcer and lupus vulgaris are much benefited and usually cured by this method. He reports treating a case of recurrence after two operations. The ulcer was very angry-looking, constantly discharging with large scab *in situ*. The third application caused the discharge

to disappear. The scab dried up rapidly and in one month the whole condition was apparently healed. Up to this date there has been no recurrence. He advocates operation in all operable cases and then again two or three weeks later following the operation with the ray. Small epithelioma he thinks should be left to the ray entirely. He thinks glass shields should be used instead of tin foil and lead as formerly used. He refers to Bruce's case of leukemia which was published in the London Lancet, and which was successfully treated with X-rays.

He closes his excellent paper with the caution to all X-ray workers to be careful in exposing themselves to the rays, and points out some of the dire results that may occur from useless exposures.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

Hydrotherapy in Heart Affection. By S. Munter. Berlin, Berliner Klinische Wochenschrift, No. 20, May 15, 1905.

Munter is convinced that with hydrotherapy we are able scientifically to control and to guide the natural curvature powers of the organism. In nervous heart affection, the torpid cases require stimulating, and the over-excited ones soothing measures. An important differential sign in nervous heart affection is increased desire to urinate with increased output of urine. This indicates good functional capacity on the part of the heart, and excludes an organic lesion. On the other hand, an organic heart affection is generally associated with a sensation of distention in the abdomen with desire to defecate, which is probably due to congestion in the abdomen.

The Bactericidal Action of Copper on Organisms in Water.

By N. Gildersleeve, American Journal Medical Sciences, May, 1905.

Dilute solutions of copper salts have a marked destructive action on many bacteria. Of these salts the sulphate is most active. This is probably due to the fact that it undergoes electrolytic dissociation more readily than the others. The amount of sulphate to be used in the water should be from 1 part in 250,000 to 1 part in 100,000, depending on the character of the water.

Colloidal copper will quickly destroy certain bacteria; should copper vessels or plates be used to destroy bacteria in water they must be kept highly polished or the bactericidal properties will be greatly reduced. The author has been unable to find evidence of copper, ingested in small quantities for long periods, having a detrimental action on the health of an individual.

Organic Origin of Certain Phobias. By P. Hartenberg, Revue de Médecine, Paris, xxiv., No. 11.

A woman complained of severe vertigo whenever she crossed a bridge, looked down from a height, or rowed in a boat. There were also "palpitations" and emotional distress. Hartenberg concluded, after observing one of the attacks, that there was no real vertigo, but merely the fear of having it. The "palpitations" were the primal cause. They suggested impending vertigo, and drugs to reduce the excitability of the heart, with a little hydrotherapy and lighter diet, soon banished the "palpitations" and with them all traces of the phobia. An organic cause can be found for every phobia, he thinks, if persistently sought for.

PSYCHO-THERAPY.

EDITED BY LESLIE MEACHAM, M. D.

Dr. Mary Pogue of Chicago gives an admirable epitome of the most important facts in mental diseases for the general practitioner, in the September Clinique. She quotes Dr. Punton of Kansas City to the effect that the great themes of the work of the American Psychological Association are (1) The great necessity of a more thorough knowledge of insanity by the general practitioner. (2) The marked and prompt curability of insanity in its incipency. (3) The extreme susceptibility of insanity to prevention.

"It is a self-evident fact that surgery could never made its brilliant life-saving record, if it were not for the early recognition of cases that are surgical by the general practitioner. The skill of the surgeon would have remained impotent without general medicine having had this training. Surgery had to teach this by didactic lectures and by clinics.

"The same thing must happen before psychiatry can do its best work. You cannot get away from the fact that you must begin with the normal, i. e., psychology and that the general practitioner must be trained clinically to recognize normal mental processes and their significance before he can be a valuable aid in recognizing the pathologic changes in the functions of the mind that point to incipient insanity."

Dr. E. W. King gave an admirable exposition of "The Influence of the Mind over the Functions of the Body" to the senior class of the College of Physicians and Surgeons in San Francisco, as reported in the Pacific Journal of Medicine. After describing the physiology of psychic processes, and the relation of the so-called vegetative functions to the mind, he says that the real questions at issue are: "What is mind? Are the words mind and consciousness synonymous? Is mind confined to conscious psychic action, or are there mental processes outside

and beyond the sphere of our normal consciousness? What shall we designate the psychic activities that take place below the threshold of consciousness?"

"One important fact is evident, which all must admit, that there is an intelligent purposeful force which operates below the threshold of consciousness, which controls the vegetative functions. This force responds to stimuli when the organ of conscious intelligence, the cerebral hemisphere, has been removed, as it does in the normal conditions. This mind whether we call it the secondary self or the subliminal self, is a very important factor in the treatment of disease and in our everyday life. We might say that all the involuntary functions are under its control. There is plenty of evidence to show that it has a consciousness all its own, separate and distinct from our normal consciousness, in a way, and yet during our waking hours at least united with it."

This subliminal consciousness or personality reminds one of a grown-up child, who has always lived with his parents, has believed in them, has never doubted their right to control him, and has accepted without criticism whatever they have told him, and at once acted upon it. In other words, it has more the characteristics of simple reflex action than that of a person governed by normal reasoning powers, judgment, and will. The hypnotic stage brings this prominently into notice.—This self is particularly susceptible to suggestive influence.—The process of hypnotization consists in the separation of the higher inhibitory ganglionic cells from the rest of the cerebro-spinal and sympathetic system.—To hypnotize a person means simply to put the normal supraliminal consciousness to sleep, that is to separate it from and take from it the control of the subliminal or reflex consciousness. Properly used and in proper cases hypnotism has done and is capable of doing much good, and so far as I know has been productive of but little harm, but I am of the opinion that a careful study of the subject will show that better results can be obtained by different methods and by the use of the same means, that is through the control of that sub-conscious mentality which presides over the vegetative functions of the body than can be obtained by hypnotism. This much, however, must be admitted in favor of hypnotism, that by its use we have been enabled to gain more knowledge of the human personality than we ever had before. By the other method of using psychic force for the cure of disease, we appeal to the patient's normal conscious mentality and through it, in a normal way, we reach the organic consciousness of the patient. The entire mentality of the patient works in harmony together, and under the direction of the conscious mind as in the normal condition. We simply appeal to the patient's reason, judgment, and common sense as we would in any other transaction. In nearly all cases of pure neuroses, and in many cases of psycho-

neuroses, if we get the confidence of the patient and present our case in such a manner as to convince him of the correctness of our conclusion, we will be able to make a radical cure. Nervousness is a disease pre-eminently psychic, and needs psychic treatment. The object of the treatment ought to be to make the patient master of himself; the means to this end is the education of the will, or more exactly, of the reason. We must not lose sight of the fact that the mind can, and frequently does, produce disease and frequently of a very serious character, and that mind can also correct these irregularities of action and restore the patient to health.

THERMOTHERAPY.

EDITED BY DAVID E. HOAG, M. D., NEW YORK.

Dry Hot Air in the Management of Some Common Pathological Conditions. By Clarence Edward Skinner, M. D., New Haven, Conn. Archives of Physiological Therapy, June, 1906.

Skinner very aptly says, in this admirable article, That the technical exposition of subjects belonging in the special fields of medical practice is rarely of much interest to the general practitioner, unless there is some point in the specialty which contains intimate contact between it and the daily routine of the physician. In these cases they may prove vitally interesting. Probably few of them are of greater interest and none of greater importance than those which involve the therapeutic application of dry hot air. Any practitioner can readily acquire the apparatus and by a little study of the literature may acquire the technical skill demanded for its proper administration. The local and general apparatus is then briefly described and technique of application explained. But it is the physiological influence that is principally entered into at this stage. This is dependent for its development upon (1) the stimulating effect of heat upon the nerve endings in the skin, which induces reflex phenomena and (2) the raising of the temperature *en masse* of the part treated, which modifies the chemical reactions in local metabolism and nutrition. The first mentioned results in profound dilatation of the capillaries of the part treated and those parts in reflex physiological relation therewith whereby is secured an emphatic local hyperemia, notably increased functionation of the sweat glands, whereby the movement of fluids through the part is greatly accelerated and the local elimination of toxins markedly augmented and a reflex stimulation of the trophic innervation of the part, whereby the tissues are enabled to take advantage of the increased blood supply to augment the nutrition and vitality of their component

cells. Raising the temperature of a substance facilitates chemical reaction among its atoms, especially oxidation; and as oxidation is the principal chemical reaction involved in metabolism, hence the second mentioned primary element is ultimately active in the same direction as the first, viz.: toward increasing the nutrition and vitality, hence the physiological resistance and recuperative power of the tissues influenced. These various actions may then be summarized as follows: (1) An increased blood supply to the part treated and to parts in reflex physiological relation therewith. (2) The withdrawal of a large amount of fluid from the part by reason of the profuse perspiration induced. (3) Immediate relief of circulatory stasis brought about by the two preceding phenomena. (4) Acceleration of nutritive processes through reflex stimulation of the trophic innervation and increased blood supply. (5) Facilitation of the chemical processes constituting local metabolism through the elevation of the temperature of the part *en masse*. This temperature elevation would also tend to inhibit the development of such micro-organisms as were particularly sensitive to thermal changes and which might be present in the part treated. The article then goes on to mention the therapeutic indications for the therapeutic use of dry hot air, laying emphasis upon rheumatism, local septic infection, pneumonia, uncomplicated sprains, arthritis deformans and such other diseases as would indicate an interference with nutrition. In speaking of rheumatism the author very wisely does not lose sight of the fact that in a very large proportion of these cases we are not justified in confining our therapeutic efforts entirely to this agent; and salicylic acid in some form, and in full dosage, should always accompany the thermal agent. When these remedies are thus combined there results immediate relief of pain, a shortening of the duration of the disease and a lessening of the likelihood of cardiac involvement.

SOCIETY MEETINGS.

SIXTEENTH ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION, SEPTEMBER 18, 19, 20, 1906.

(Held at the College of Physicians of Philadelphia.)

The Sixteenth Annual Meeting was called together in Executive Session at 9.30 A. M., by the President, Dr. William Benjamin Snow of New York City.

Upon motion the reading of the Minutes was dispensed with. The Report of the Executive Council was read by the Secretary as follows:

Dr. Morris Weil Brinkmann moved the adoption of the Report of the Executive Council and offered as an amendment the addition of the words "cases of arrearage for dues." Seconded and carried.

The applications for membership of Dr. Samuel McClary 3d and Dr. Rachel Williams were read and on motion seconded and carried. The Secretary cast the ballot for their election.

Under "Communications" a letter was read by the Secretary from Dr. Robert J. Nunn, stating his regrets that owing to sickness he was unable to be present.

Under "Reports of Committees" Dr. Brinkmann reported for the Committee upon Change of Name that after discussion it was suggested that a change of name of the Association be recommended, which should be American Physico-Electro-Therapeutic Association. It was moved and seconded that the report be accepted and placed on file.

Dr. Brinkmann also reported that it was the sense of the Executive Council that it should be authorized to pay annually a sum to the Secretary, not to exceed \$100, if in their judgment the funds of the Association warranted it, to enable him to pay for the mechanical portion of the work of the Secretary's office.

A motion to postpone the Reports of Standing Committees to the Scientific Session was made by Dr. Brinkmann. Seconded and carried.

Under "Unfinished Business" Dr. Brinkmann moved the adoption of the resolution recommending that the Executive Council be authorized to pay annually to the Secretary a sum not to exceed \$100.

Dr. Brinkmann also moved the adoption of the Resolution approved by the Executive Council that the Executive Council should be authorized to extend membership in cases of arrearage of dues for proper cause.

Dr. Brinkmann further moved that the official organ of the Association should be the channel of communication between the Executive Council, the officers and the members of the Association; and that one page of the official organ shall be under the control of the Executive Council and shall be edited by the Secretary.

Dr. Brinkmann reported that the Executive Council recommended that local societies be formed under the direction and in conformity with the American Electro-Therapeutic Association. Seconded and carried.

The amendment to the Constitution proposed by Dr. Weber providing that nominations be made from the floor was on motion rejected.

A recess was here taken for the formal opening of the Scientific Session.

The Scientific Session was called to order at 10.30 by the

President, and opened with prayer by Rev. Dean Groton. Addresses of Welcome were made by Hon. John Weaver, Mayor of Philadelphia; Dr. Charles K. Mills, President of the Philadelphia County Medical Society, and Dr. John V. Shoemaker of the Medico-Chirurgical College. The response was made by Dr. Charles R. Dickson of Toronto, Canada.

Under "Communications" a letter of regret from the Treasurer was read, and upon motion the Secretary was instructed to send a telegram expressing the regret of the Association at his absence.

The President's Address was then read, and on motion of Dr. Massey a Committee of Three was appointed to consider the matters presented.

Reverting to the Adjourned Executive portion of the program, the report of the Committee on Induction Coils and Alternators was read by the Chairman, Dr. Brinkmann.

REPORT OF COMMITTEE ON COILS AND ALTERNATORS.

During the year which has elapsed since the last report of your committee, no important theoretical or practical novelty has developed in the construction of large induction coils, and the statements made at that time in this connection seem to be re-enforced by more extended experience.

Your committee can also state more strongly than ever that interrupters for coil work continue to leave much to be desired, and we believe this is the consensus of opinion of those who are best qualified to judge. We should recommend a very conservative attitude to the claims made for any apparatus intended to cover a wide range of quantities as well as interruption rates. We desire to again call your attention to the basis of the points of merit for interrupters for large coil work as contained in the report of your committee for 1905.

In induction coils for induced-current work there is only to note the device for synchronous multiple pitch variation induction currents, as reported at our last meeting; as also the construction of a five-ribbon interrupter coil.

These devices are already described in our Transactions. The field opened by these new types of transformers for therapeutic work is of sufficient importance to warrant careful investigation by you all. The use of sonometer or tuning forks as standards in describing induced-current treatments will, it is predicted, in the future be a necessary element of accurate reports.

With reference to sinusoidal apparatus it would be of interest to many if the fact were recalled that the so-called collector rings—on an appropriate dynamo or motor commutator when connected by brushes—will produce a perfect sinusoidal cur-

rent, which must of course be controlled by the intercalation of an appropriate rheostat. For therapeutic purposes this means of generating this current cannot be improved upon either on the score of economy or of simplicity.

Of interest to all will be the work now being done in the field of choke-tubes. Through these devices a control of the alternating character of the secondary discharges of large coils may be so developed that the attainment of true polar actions becomes possible.

In the field of high-frequency apparatus also, nothing of importance has become public knowledge. We are informed, however, that there are several developments of value being carefully tested. The test by meter of these high-frequency discharges is still accepted with the greatest skepticism by the majority of the workers and observers in this field. In this skepticism your committee heartily concurs.

Concerning the work that has been done in the description, investigation and development of the rapidly alternating field, we are at this time in the pioneer stage only—measurement of frequency of pole changes being established in some apparatus by the tachometer method, this applying, of course, to the circular method of generation. In all devices depending upon interrupters and induction devices, the chronograph, siren method, sonometer, telephonic and pitch scale methods are the means for determining rate. Intensity of the magnetic field is determined in the usual manner.

Physiologically all observers attribute sedative effects to this modality, in proportion to the velocity of the polar alternations.

Finally your committee desires to request consideration by the Committee on Nomenclature of the distinguishing terms for induction currents—separating by a practical set of terms the therapeutic current as used and distinguished heretofore under the title of faradism, from the induction current as developed in large coils using heavy currents and subsequently otherwise transformed for therapeutic purposes.

M. W. BRINKMANN,
Chairman.

REPORT OF COMMITTEE ON METERS.

Your Committee on Meters begs to report that the past year has brought to their attention no new device for the measuring of ordinary electrical currents. A number of attempts have been made to affect a measurement of the X-ray.

Your chairman during the past year, after many experiments, has devised a direct-reading X-ray meter which is new and novel, and possesses some points of merit. It depends, for its action, upon the well-known power of a selenium cell to lower its ohmic resistance when exposed to light, such light being

either natural or artificial, the result of phosphorescence or fluorescence.

If a good selenium cell, such as that made by Ruhmer of Berlin, be connected in series with a variable rheostat and a galvanometer or milliamperemeter of sufficient delicacy to indicate the passage of current of small magnitude and the rheostat be so adjusted that the resistance of the rheostat, the selenium cell, the galvanometer and the necessary wiring is exactly sufficient to counterbalance the electro-motive force of the source of current, the selenium cell being inclosed in a light-proof container, no current will flow and the meter will stand at zero. If, however, the walls of the light-proof container be coated interiorly with one of the fluorescent salts either cyanide, tungstate or artificial willmite, and the container be placed in the path of the radiation of a Crookes tube, the interior of the box will become illuminated by the fluorescence induced by the ray upon the salt, which fluorescence is in direct proportion to the quality and quantity of X-ray. The selenium cell thereupon will lower its ohmic resistance in direct proportion to the illumination and current which flow (the balance of the circuit being distributed) proportionate to the fall of the ohmic resistance and will be indicated upon the dial of the galvanometer, which thereby becomes a direct-reading meter of the X-ray since the reading is proportionate to the current, which is proportionate to the fall of resistance of the selenium cell, which is proportionate to the illumination produced by the fluorescence, which is proportionate to the X-ray producing the fluorescence.

The scale or reading of the meter will be calibrated in arbitrary divisions, which will be standardized as soon as science shall agree upon a C. G. S. unit of X-radiation.

Attention should also be drawn to an ingenious penetrometer which is an adaptation of the standard penetrometer of Benoist, fixed before a fluorescent screen, which screen is a part of a reflecting fluoroscope as devised by your chairman, the fluoroscope provided with a long extension tube as devised by Pfahler, and the eye-piece rotating and divided into several points corresponding to the several layers of the penetrometer under observation, the remaining segments being blocked out by a lead disc, revolving synchronous with the eye-piece, thus but one segment of the penetrometer being visible at a time, thus facilitating the comparison of penetration with the standard central silver disc; the whole combination being attributed to the ingenuity of Mr. H. C. Snook, and permitting of unusually accurate determination of penetration according to the standard of Benoist, with safety to the observer. All of which is respectfully submitted,

GEO. C. JOHNSTON,
Chairman.

COMMITTEE ON STATIC MACHINES AND CONDENSERS.

As the chairman of your Committee on Static Machines and Condensers, I desire to report that the changes made during the past year are such as not to warrant any special attention. Static machines are constantly on the increase, not only as to the manufacturing of the same, but it is not unusual to find the machine in all of the rural districts. Static machines are, as a whole, giving satisfaction and in many cases doing good work.

The divided plates introduced by one manufacturer does not seem to produce any special improvement in treatment, but possibly it is convenient in cleaning the machine or where it is necessary to replace a broken plate.

A new static and X-ray machine has been introduced during the past year with great claims as to its durability and efficiency. The manufacturer claims an entirely new departure from the established type. One pair of plates are sectored, the others being plain. All of the plates revolve but each pair in opposite direction, thereby claiming double speed surface without increasing the number of revolutions and doing away with any loss of power by friction. The manufacturer also claims to have revolutionized the generative process by the introduction of a plate, the composition of which is not revealed, which cannot be broken at any speed and is not affected by the changes in the atmosphere. The machine is self-charging and, it is claimed, will work as well in dog-days as at any other time of the year.

The manufacturer also claims many other superior qualifications for his machine. I tried to purchase one of these machines for experimental use, but the price was absurd. Otherwise there is nothing of special note to record.

H. H. ROBERTS, M. D., Chairman.

REPORT OF COMMITTEE ON RADIANT ENERGY.

Fellows of the American Electro-Therapeutic Association: As chairman of your Committee on Radiant Energy including apparatus and means for diagnostic use of light, the Roentgen ray and radio-active substances, I beg to state that Prof. Sheldon found it impossible in connection with his other duties to contribute to the committee's work, that Dr. Crothers had nothing new to submit and that Dr. White contributed the few notes on high-frequency tubes embodied in the report which I have prepared for you.

Owing to the fact that urgent professional duties prevent my attendance upon the meeting, I am obliged to submit this report without submitting it to the rest of the committee for their signatures.

First, I would like to call the attention of the Association anew to the value of the visible spectrum as a therapeutic measure and to recommend at least the following two forms

of apparatus, which from an extended experience I have found of most practical and of great value. The one is the electric arc, as embodied in the marine searchlight. This I have used for nearly six years and it has never failed me in any particular. I have used these marine searchlights of varying amperage, and unhesitatingly recommend them of from 10 to 40 amperes, as may be preferred. They may be used with or without the intervening screen of blue glass, according to indications.

For incandescent light, unless an incandescent cabinet bath is desired, I can heartily commend the single high candlepower lamp, such as is known as the Leucodescent Therapeutic Lamp of candle power varying from 50 to 500. This is an excellent and practical device. Incandescent light baths lend themselves more to institution than to office work, but the single high-power incandescent light is a most valuable addition to the physician's armamentarium. It may not be practical, but I would suggest to the makers through this report, the desirability of containing blue glass globes. Possibly the lamp could be so constructed as to change from white to blue at will—certainly an all blue globe could be used which would minimize the heat (often desirable) and at the same time permit of the passage of all the penetrating energy of the blue indigo, and violet end of the spectrum.

This would increase the usefulness of this lamp, i. e., enable it to be used in a greater variety of cases, for whom the present heat is objectionable.

Prof. Lachlan Gilchrist, Late Fellow of the University of Chicago in Physics, and of the New Demonstrator University of Toronto in Physics, reports the following from an examination of the spectra of the lamps marked Packard 500|110, 300|110, Carbon Filament 50|110, Manhattan 32|110, furnished him.

The exposures for the negatives were such as to make the red end of the spectrum about the same in all lamps, and the difference in the remaining parts of the spectrum is thus brought out. The photographs show a considerable increase in the difference between the high-power and low-power lamps as we proceed towards the violet, and show the high-power lamps extending farther into the violet than the low-power lamps.

These are the lamps used by the Leucodescent Therapeutic Lamp Co. Their 500 candle power lamp is the only very high-power incandescent lamp which I have had the opportunity of using. It meets the physician's needs admirably.

The need is for practical and inexpensive light apparatus that may be installed in the office of the country physician as well as the city specialist. To this end the incandescent lamp, blue, set in a parabolic reflector as devised by Minim and of

varying candle power, 16 to 100, is doing good work in the hands of many country practitioners.

Finsen's apparatus remains unique for the treatment of skin diseases, where a large quantity of light, shorn of its heat, condensed and concentrated, is desired. The Finsen-Reyn apparatus works to the same end, but can, I believe, be had at less expense than the Finsen. I use the condensing lenses of a Finsen tube with an intervening water chamber, connected suitably to my marine searchlight with good results in many cases of skin trouble. It is the quantity of light which is necessary, and the impression that it is ultra-violet light alone which is desired is untrue. It is the great quantity of the penetrating energy of the blue region of the spectrum, just as it is in general medical work.

REPORT ON HIGH-FREQUENCY TUBES.

There have been but few improvements in high frequency tubes since our last meeting, which gave us tubes for general use, and the set of special local tubes with a single handle. Since then we find local tubes for skin diseases which can be used either for X-ray or high-frequency. The roller vacuum is a useful one, but the current striking against the glass roller from a small piece of metal to which the cord is attached from the machine if *not* moving is apt to heat one part of the roller, making it too hot to be agreeable when applied directly to the skin.

The cataphoric high-frequency tubes have been improved, by the use of a point instead of the disk giving a better local effect. The disk style of tube for general use, varying as it does the amount of vacuum, giving from the crimson illumination to the higher vacuum of white and up to the yellow-green as seen in the X-ray, seems to have more penetrating power. I have been using eye-tubes of both vacuums, the crimson being best for superficial inflammations while the green seems to strengthen the eye itself, apparently helping the sight.

The metal high-frequency electrode devised by Dr. Doumer of France for relief of hemorrhoids and enlarged prostate has not been improved upon, and still does good work.

ROENTGEN RAY COILS AND ACCESSORIES.

The matter of X-ray coils has been looked up as well as possible in my absence from the city, and I would submit the following facts in reference to their construction from which one may arrive at an estimate of their relative value.*

* If changes have been made in the construction of any of these coils since the above data was gathered together, your chairman is in ignorance of the same.

The Jackson coil is not included, simply because the requisite data, probably through an oversight in the forwarding of my mail, did not reach me. I have used it, however, and like it very much for its high-frequency discharge, but prefer always a direct-current X-ray coil. The necessary data for the coil put out by Van Houten and Ten Broeck is not at hand, and is therefore not considered in detail. It is believed to be a good one.

The different makers of Standard X-ray coil apparatus in this country are:

1. Heinze Electric Co.
2. Willyoung & Gibson.
3. Western X-Ray & Coil Co.
4. Scheidel & Co.
5. Wappler Controller Co.
6. Waite & Bartlett.
7. The Knv-Scheerer Co.
8. Queen & Co.
9. Biddle & Co.
10. E. B. Meyrowitz.

Heinze Electric Co.

construct the thin section coil with cotton-covered wire and do not use wax or oil insulation of any sort, around coil. They use mica tubes between their primaries and secondaries, mount their coils in boxes and use screws and nails in construction of box.

Willyoung & Gibson

adopt the thin section method and pump each set of sections. They ordinarily use rubber tubing between primary and secondary and encase coil in rubber jacket and use wood end pieces with screws holding same together.

The Western X-Ray & Coil Co.

wind their coil in 1 1-2 inch sections; cannot say the kind of tube used between primary and secondary but their coils are immersed in vaseline, the boxes having nails and screws to hold them together.

Either the Western or Schiedel have made the bobbin type of coil. This is two or more large spools of wire (carefully wound) and suspended over the ends of the primary.

Scheidel & Co.

wind by the 1 1-2 inch section method and immerse their secondaries into a substance very much like vaseline. The cabinets containing the coils are nailed and screwed together. They have also used fiber tubes.

Wappler Controller Co.

manufacture small-size coils and place them in marble cases. Do not know the type of coil nor the material into which the secondaries are immersed.

Waite & Bartlett

furnish the thin section (each 3-16) coils wound in paraffin and secondaries molded in a mixture of beeswax and resin. Each series of sections are pumped by a vacuum process. The coils have rubber tubes between primary and secondary, are entirely incased in hard rubber.

The Kny-Scheerer Co.

manufacture vacuum pumped thin section coils molded in a mixture of beeswax and resin. They use in their larger coils mica tubes between primary and secondary and incase entire coil in hard rubber. The supports and braces are held together with screws, which extend down into magnetic field so that the spray effect is often seen at the ends.

Queen & Co.

evidently manufacture the bobbin type or at least place their windings over the ends of the primaries as the secondaries can be separated. They use beeswax and resin for insulation and incase their coils in a rubber jacket having wood or rubber end pieces. Cannot say whether they use mica or rubber tubes between primary and secondary, but think they use mica in some cases at least.

Biddle & Co.—now called The Roentgen Ray Coil Co.

construct their coils very much like Queen & Co., using beeswax and resin insulation, probably mica tubes between primary and secondary and incase in a thin shell of hard rubber with wood end pieces.

E. B. Meyrowitz

make the thin section type of coil by the vacuum method and use a mixture of beeswax and resin for insulation into which the secondary is molded. Mica tubes are used between the primary and secondary on all sizes over 8 inches. These coils are all placed in cabinets and immersed in paraffin. The cabinets have *no nails, screws, or sharp corners or points* in their construction.

This is an important feature, as any metallic substances or accumulation of dust, dirt, or dampness tend to influence the secondary when coil is in action and eventually result in deterioration and loss of efficiency. In fact a breakdown is eventually the result.

After the coil is placed in cabinet and filled with paraffin, the cover is sealed into place so that dampness cannot enter. The discharge posts are of heavy hard rubber and fitted to cabinet so that the secondary terminals are carried a safe distance from coil.

It might be well to note the different insulating material being used in coil construction given in their order regarding efficiency:

Beeswax (the very best).

Paraffin (next best).

Vaseline.

Heavy vegetable oil.

Heavy mineral oil.

The best quality of silk-covered wire on secondaries is also used and the primaries are carefully baked.

The objection to using hard rubber casings as is done by Willyoung, Waite & Bartlett, the Kny-Scheerer Co., Queen & Co., and Biddle & Co., is that dampness eventually collects under this casing (being loosely put on) and cannot be removed. Eventually paths are made through wood or rubber from spraying induced by these foreign conductors and eventually make their way between secondary winding to the primary, either puncturing the tube or short-circuiting the secondary discharge.

Wooden end pieces brought near the ends of the secondaries offer the same objection, as dampness is absorbed.

Screws or nails attract the secondary current in the way first by invisible spray which continues to grow until a marked discharge is often seen, and if not checked will result in breakdown.

Mica tubes are preferable to hard rubber between primary and secondary, as there seems to be no difference in expansion between the wax and tube when mica is used. Besides, rubber deteriorates from the effects of heat which is generated at the primary.

Unfortunately the best materials for a coil, such as beeswax, mica tubes, and a well-constructed cabinet, having no screws or nails, are very expensive, but to insure perfect insulation these must be used.

This means a higher price for an apparatus, but from my experience with this coil it is money well invested.

The variable inductance primary feature of the Biddle or Roentgen Ray Coil Co. is a good one, if carried out by the Walter method. The Walter primary is so constructed that there are no "dead" layers or turns when coil is in action. On some coils made here in this country (Biddle's is one) the primary winding is divided in four or five sections and governed with a lever switch which cuts out one or more of these. Where "dead" layers exist there is more liability to short-circuits and breakdowns, where if the true Walter method was adopted which throws the primary windings into series, multiple series, or multiple every turn is brought into action. This gives the coil a better balance and precludes the liability of breakdowns.

The Roentgen Ammeter is no doubt a good instrument regis-

tering the milliamperes passing through an X-ray tube. It also shows to a certain extent the capacity of a tube. The lower the tube the higher the reading on the meter. When it is critically low the meter will reverse. When the maximum amount of current is forced through a tube the needle will remain at a given point which will represent the highest point at which that tube can be forced at its present vacuum. If more current is forced through the tube the needle will begin to show inverses by dropping back a few points or in case it is forced too much, may go back to zero or reverse entirely, showing that the tube has been overheated to a point where gases have been thrown off from the metal parts temporarily lowering the vacuum, making the tube useless for the time. On the other hand, if the metal parts are sufficiently deprived of their gases to preclude the dissipation of same from overheating, the positive ions may attack the inner walls of the tube from a sudden forcing of the current, producing a condition which makes the tube appear very high. This will be noted on the meter by an unusually low reading. It should be understood that the operator must become familiar with each tube so that its capacity will be approximated.

The Roentgen Conductor Reel is, of course, very convenient. The use of cord reels for taking up the slack wire dates back to the Dresser patent where these were used on galvanic and faradic apparatus. The fish-tackle reel and the ordinary steel tape are being used for the same purpose.

Penetrometers are of great service for estimating the penetrating power of the X-ray tubes, but it is rather impossible to standardize these until a fluorescing material is produced which is absolutely stable.

The Biddle or Roentgen Ray Coil Co. have placed one on the market.

The Radiographic Table and lead glass shields are of great convenience to the operator. The shield cuts out from 80 to 90 per cent. of the injurious rays, and thus protects both operator and patient, whereas these tables, as put out by the best houses, are designed very conveniently for doing all kinds of work.

For radiographic work, to avoid the injurious rays a special metal-lined or protected room from which the operator manipulates his tube through an aperture, communicating with the room in which the patient is placed for a fluoroscopic examination, or for the purposes of radiographs, is recommended. For therapeutic work tubes of lead glass with a window for the active energy desired are always recommended.

Radio-Active Substances.

When all is said and done, it seems to your chairman that Dr. Robert Abbe's exposition of the place, value, methods, and

dosage of radium, as presented to the Boston meeting of the American Medical Association, *Radium in Surgery* (June, 1906), is the best and most complete to appear. The working unit of the most powerful and pure radium manufactured is 10 milligrams radium bromide, 1,800,000 radio-activity, and is best used in a small cell covered by a thin layer of mica. As this cannot be sterilized for insertion into tumors, Abbe has had six such cells emptied into one small, thin glass tube about one inch long and scarcely larger than a match stick, and two more cells into another similar tube blown a trifle larger at one end and sealed hermetically. Two other cells are reserved for surface applications. Abbe concludes:

- (1) Radium action resembles that of Roentgen rays.
- (2) It differs specifically and will cure some cases promptly which resist the latter.
- (3) It is applicable to the interior cavities of nose and mouth, inaccessible to the Roentgen ray.
- (4) It is curative in most superficial epithelial cancers and lupus.
- (5) It has failed of curative action as yet in forty test cases of grave internal cancers.
- (6) It promises interesting results in other surgical conditions under study.

These conclusions are in absolute accord with those obtained by your chairman, whose field of observation has been small, however, as compared with that of Abbe. For class of cases, technique, dosage, and results, your chairman respectfully refers you to Abbe's original article, *Journal of the American Medical Association* of July 21, 1906.

In malignant conditions Trypsin now commands the attention of the medical world. More than enough is known to invite the most careful and complete investigation.

Although not pertinent to this report, still in the interests of medical science and humanity, I wish to say that I have seen enough to convince me that it has a value, whatever the ultimate outcome in the way of prolongation of life and perfect health may be.

Respectfully submitted.

MARGARET A. CLEAVES, M. D.,
Chairman Committee.

September 17, 1906.

BOOK REVIEWS.

PROGRESSIVE MEDICINE. A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES, AND IMPROVEMENTS IN THE MEDICAL AND SURGICAL SCIENCES. Edited by HOBART AMORY HARE, M. D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia; Physician to the Jefferson Medical College Hospital; one time Clinical Professor of

Diseases of Children in the University of Pennsylvania; Member of the Association of American Physicians, etc. Assisted by H. R. M. LANDIS, M. D., Visiting Physician to the Tuberculosis Department of the Philadelphia Hospital, to the White Haven Sanatorium and to the Phipps Institute; Demonstrator of Clinical Medicine in the Jefferson Medical College. Volume III. September, 1906. Diseases of the Thorax and its Viscera, Including the Heart, Lungs, and Bloodvessels—Dermatology and Syphilis—Obstetrics—Diseases of the Nervous System.

In this number Dr. Ewerts considers the subject of Tuberculosis, considering the progress of the subject during the year with reference to the observations and experiments of a large number of observers. Careful consideration is given both to prognosis and treatment. In the latter stress is put upon drug medication, postural treatment of hemoptysis, diet, digestion, and nutrition, also the Opsonic Immunization and Vaccine Treatment of Tuberculosis, on which the writer seems to place particular emphasis. It is here again to be regretted that the writer has been short-sighted in the employment of newer and probably most valuable means of combating the white plague by the use of radiant energy in the form of radiant light, the X-ray, and high-frequency currents. The writer considers also the affections of the bronchi, pleura, and other lung conditions, including also a section on the physical examinations. The pericardium and the various conditions connected with the heart are considered at considerable length as well as reference to methods of examination and treatment of heart affections. The physical measures that are considered are Nauheim Baths and Exercise and Bandaging of the Extremities. Greatest reliance is placed on drug medication. Affections of the blood vessels receive considerable attention.

In the consideration of Dermatology and Syphilis, Dr. Gottheil considers the various methods of treating skin affections. The writer illustrates numerous rare conditions, considering the reported cases and pathology from various writers. From the observations on the uses of the X-ray there is evidence to a great degree of timidity in its employment at the present time and the want of an established correct technique. From present indications in outside reports, general practitioners are obtaining better results in various skin affections from the X-ray and high-frequency currents than the skin specialists. Dr. Norris, in the chapter on Obstetrics, considers Eclampsia by reference to Dionst to discover poison sighting the condition. The treatment also of the various authorities is considered. Other considerations of a general subject receive proper attention in the work, particularly obstetric surgery and the puerperal period. Diseases of the Nervous System by Dr. Spilear, covers the consideration of the general field for the year, treating of the Diseases of the Brain and Spinal Cord. Conditions in tabes are considered, without reference to the advances in the treatment of the condition. The paper closes

with a consideration of miscellaneous nervous diseases, including paralysis agitans, hysteria, etc. As a whole, the volume is a valuable contribution to medical progress and a record of the present status of the subject.

NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

A NEW COLLAPSIBLE FLUOROSCOPE.

A New Collapsible Fluoroscope designed to be used in connection with portable apparatus is being placed on the market by the B. & B. Apparatus Co., of Salem, Mass.

The instrument, as will be seen by referring to the cut, comprises a fluorescent screen mounted under glass for protection in a firm wooden frame, to which is attached an opaque shadow cloth and detachable handle.

In use the cloth is thrown over the head thus excluding all light rays, and an unobstructed view of the screen had to the



best advantage, as the fluorescent surface can be placed at the proper distance from the eyes.

If desired the cloth may be folded to the back and the instrument used as a simple mounted screen in a darkened room.

When not in use the cloth folds nicely against the frame, occupying but little space.

A NEW SPARK-GAP MUFFLER.

The convenience of a muffler in connection with the operation of the static machine in employing the wave-current is generally appreciated by the profession. In the accompanying cut is shown the design of a muffler constructed of a tough fibrous material, non-conducting in character, a quality essential to the success of the muffler. The material is saturated with sulphur by immersion in a melted bath, until both a mechanical and chemical union is effected. It is then subjected to great pressure in an especially constructed press until cold, making a hard, tough, and flexible plate, the same being used for X-ray plates as well as for the construction of these mufflers. To apply the muffler, open and slide the lower half along until the discharging rods slip into the slot or hole at each end, then let down to the upper half. When in use it is best to have either the hinges or the opening at the top to equalize the pressure on the springs. The mufflers are made from four to ten inches in diameter, and are sold for from \$3.00 up. The mufflers are manufactured by Henry B. Todd, of Meriden, Conn.

TRANSLATIONS.

An Attempt to Use the Electric Conductivity of Urine for Clinical Purposes. G. Kolischer and L. E. Schmidt, Illinois Medical Journal, April, 1905.

These authors have developed a method for ascertaining whether or not a kidney is doing its normal amount of work, which involves the use of hypodermic injections of indigo-carmin for staining the urine and estimation of changes in the degree of electrical conductivity of the fluid. They find that the urine from normal kidneys always shows a slight decrease of electric conductivity after this staining has colored the secretion, which decrease, however, never exceeds nine international ohms. Urine drawn from pathological kidneys will always, after staining, show a decided increase of electric conductivity. As a result of their observations they feel justified in stating that any increase of electric conductivity, after staining, which goes beyond ten international ohms is characteristic of impaired health of the kidney. If this increase does not go beyond twenty ohms the kidney may be considered safe in a surgical sense; if the conductivity is increased beyond twenty ohms then the kidney is to be considered absolutely unsafe and not able to do the work of the whole organism.

Such determination of the functionability of the kidney is valuable in cases where disease of one organ may indicate its removal, and information, as to the ability of the other organ to carry on the functions of the body, alone, is desirable.

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TUBERCULAR ANTITOXIN.*

BY J. D. GIBSON, M. D., DENVER, COLORADO,

Member of Denver County Medical Society, Colorado State Medical Association, American Medical Association, American Roentgen Ray Society, American Electro-Therapeutic Association, etc.

Mr. President and Members of the Association:

The subjects of toxins and antitoxins have been for years of greatest interest to the medical profession.

Pasteur led the way into this misty realm of darkness in his discovery of the etiologic cause of chicken cholera, and his successful attenuating of virulent bacteria and using them as vaccines opened up a new field in medicine.

Closely following Pasteur's successes came the announcement by Koch of his discovery of tuberculin and by Von Behring of his diphtheritic antitoxin, the utility of which he was able to demonstrate and time has only added to the luster of his achievement.

These successes have only stimulated the scientific world and caused a more interesting research in this interesting field, evolving much that is of use as well as many disappointments. Among all the subjects investigated none have received more attention than tuberculosis. The great majority of the members present to-day remember the great interest excited when Koch announced his discovery of tuberculin. How high the hopes ran, how eagerly information was sought on every hand yet how disappointing were the results. This had scarcely died away when our attention was attracted to the watery extract of tubercular bacilli, which many of us used and not always, I am sorry to say, with brilliant results, because we used it in cases where later experience has proven it to be absolutely contraindicated, and of course failure was the result.

* Read at the Sixteenth Annual Meeting of the American Electro-therapeutic Association at Philadelphia, September 19, 1906.

Maragliano has gone a step farther and uses injections of specific tuberculous bacteriolysins directly into the lungs. He obtains his bacteriolysins by injecting animals with a watery extract of living tubercular bacilli from which he obtains his serum containing the bacteriolysins, which serum is injected directly into the lung tissue. He claims marked improvement in cough, expiration, temperature, and night sweats. This, you will see is different decidedly from tuberculin and the watery extract of tubercular bacilli of Von Rucks, as both are made from the extract of dead bacilli and ordinarily are not expected to be injected into the lung tissue.

Lately there has been demonstrated a substance in the blood, which has a distinct, important power of influencing bacilli in such a way as to cause positive chemiotaxis or engulfment of the bacteria by the leucocytes. Wright and Douglas, Neufel and Rimpau have been the pioneers in this work, and it seems that some good is to come out of their laborious experiments, but it is difficult to say just how much. They have demonstrated pretty clearly, I think, that the ordinary tubercular patient has what is called a low opsonic index, but small doses of tuberculin will raise this index or definitely increase phagocytosis. Human serum is supposed to contain different opsonins for different bacteria, and by the use of immune serums opsonizing power of the leucocytes can be greatly increased and the negative chemiotaxis can be changed to a positive chemiotaxis.

Wright and Douglas of England, Pogue, Dennison, and others in this country have been calmly investigating the effects of tuberculin, Koch's latest tuberculin or T. R., as well as his latest glycerin mixture, and have recorded some brilliant results in the treatment of tuberculosis pulmonalis: in fact the results recorded by some make the statement of the illustrious Von Behring that he believes he has been able to eliminate a substance from tubercular bacilli, which he calls T. C., that causes the hypersensitiveness to tuberculin, through which he hopes to change an "active immunity into a passive immunity,"—not so far-fetched as may appear at first.

Roux and Vallee claim to have produced immunity in cattle by feeding calves with small quantities of cultures of living tubercular bacilli *et cetera*, or in other words cause immunity through the alimentary canal. Calmette and Guérin obtained

like results. I rather think from my own experience with streptolytic serum that the alimentary canal route will be a very important route in the production of artificial immunity. Prof. Theobald Smith has shown in his elaborate experiments that heating the tubercular bacilli to 100° C. does not destroy the toxin of the bacilli entirely. I would suggest along this line might not the eating for ages past of beef affected with bacilli have had a great influence in establishing to some extent racial immunity, and might it not be in rare cases of use in establishing a personal immunity? The Jew for ages was an absolute abstainer from hog meat, but has always been a consumer of beef. Might not this have had something to do with their predisposed immunity, and is it not a fact, that the greater amount of beefsteak eaten or, in other words, has not the beef eater the greatest chance of getting well and acquiring immunity? We have all noticed the effect of beef juice in tubercular conditions and someone is continually making the "new discovery" of the value of beef juice in consumption. Therefore is it not possible for the juice of beef, beef that is immuned before death, to be of use in conferring immunity on the patient who drinks it?

So, now, Mr. President, after this brief review of the work that has been accomplished along the lines of immunity, I wish to bring before this association an hypothesis along the same line of tubercular immunity. Some of you will remember in previous papers before this body, I have claimed for the X-rays only the power of producing local engorgement, or hyperemia of the lung and on account of the increased nutrition, thereby afforded, nature was able frequently to fight a winning battle with the bacilli, where otherwise failure was inevitable. Practically the evolution of the tissues in the old theory is, I think, correct, but I believe that it does not go far enough and does not explain the startling and successful results in many cases.

H. B. Wilkinson, M. D. (Jour. A. M. A., February 3, 1906), physician in charge of "San La Zara Hospital," P. I., reported thirteen cases of leprosy treated by the X-rays and in which three were absolutely cured by means of the X-rays, so that no leper bacilli could be found. All except one, as I remember, were restored to usefulness.

In summing up his report the doctor called attention to the fact that the X-rays were able to benefit the bad cases,—cases

in which there were a great number of leper nodules and ulcerations that could be reached with the rays at one treatment, but in mild and incipient cases the rays seemed to have no effect. He advanced the hypothesis that the lepra bacilli were killed by the rays, and that they were then absorbed by the system, being of the endotoxin group. When absorbed, the toxin was liberated into the blood and lymph streams, where they excited accordingly a production of specific antibodies to be thrown into the blood for their neutralization, which cured his cases.

The part of this most highly interesting paper that attracted my attention most was the different effect of the rays in mild and severe cases.

I had noticed the same effect in my tubercular work, but was at a loss to account for it. I had often noticed that the mild incipient cases of tuberculosis, which get well under almost any kind of treatment will progress very little faster with the X-rays than without it. In fact they are nearly all unsatisfactory cases, while my best results are with advanced and almost hopeless cases.

Therefore I have come to the conclusion from clinical experience that I am causing with X-rays in advanced and suitable cases, a destruction of tubercular bacilli, bacteriolysis, which being absorbed into the blood, the toxin, which being an endotoxin is very likely set loose into the blood and lymph stream, arousing a reaction and production of antibodies or amboceptors of Ehrlich, or possibly in their own mysterious way increasing the opsonic index of the individual, even to the point of changing the negative chemiotaxis for an absolute positive chemiotaxis so that the phagocytosis may be increased sufficiently to take care of all the emergencies that may arise. In other words you produce in suitable cases by means of X-rays an autospecific or tuberculin toxemia arousing a reaction in the host of the liberated toxins that may be of great benefit to the patient. You will notice that there is a wider difference in the class of cases in which X-rays have given me the best result than cases in which the tuberculin group of agents are advised. For instance these agents are recommended to be used only in cases where there is no elevation of temperature, no mixed infection, no pleurisies, no cavities, nor unresolved pneumonias. They are to be used in strictly incipient or chronic tubercular infections, where if you get any toxins to

amount to anything, they must be introduced from without, while in cases best adapted to the X-rays, you must have the germs in sufficient quantity in the pleura, lungs, glands, or somewhere in the body to cause by their destruction the toxin desired. Acute cases with high fever, unresolved pneumonias, pleurisies with or without effusion, cavities, consolidations and



Fig. 1.—Case I, Incipient tuberculosis.

adhesions, none of which are a bar to X-rays, if the effect is properly guarded.

Mr. President, I do not want to be understood in this paper to advocate X-rays as all that is needed in tuberculosis pulmonalis, glandular tuberculosis, or tuberculosis abdominalis: while in advanced cases in my hands it is worth more than all other artificial agents combined, yet it must have its adjuncts, rest, diet, sunshine, fresh air, change of climate,—when it can be judiciously accomplished,—and medical agents. According to my idea the adjuncts arranged in importance are as follows: first, diet; second, rest; third, sunshine; fourth, change of

climate and surroundings; fifth, fresh air; sixth, medicinal and hygienic measures as indicated. I think the fifth of this grouping, fresh air, is the most harmfully accentuated agent in the whole category, and when you couple with it the customary idea "exercise" that is frequently instilled into the patient's mind on leaving home for a change of climate, you have, in a large measure before you the cause of the vast majority of failures and deaths of these individuals. Nothing can be more absolutely harmful in high altitudes for sick individuals than exer-



Fig. 2.—Case II, Normal lung.

cise, which many think is necessary for "fresh air." Fresh, pure air is a necessity, can be had anywhere and in greatest abundance but is not absolutely a specific for tuberculosis. I will call attention to a few skiagraphic prints with reports of cases to illustrate to you the points claimed in this paper.

No. 1, M. C., incipient case of tubercular involvement of left lung, as was shown on careful physical examination as well as by the skiagraph. Result, improved slowly but surely. X-rays

hastened the progress very little, if any: results as far as the X-rays were concerned unsatisfactory.

No. 2, Mrs. R., sent to Colorado from Philadelphia and said to have slight tubercular involvement of the left apex. Skia-graph failed to show it. My developer, however, thought he could make out a slight shading of the left apex, and the lady herself thought so and wanted the X-ray treatment herself on account of what she had seen in results with other patients. To

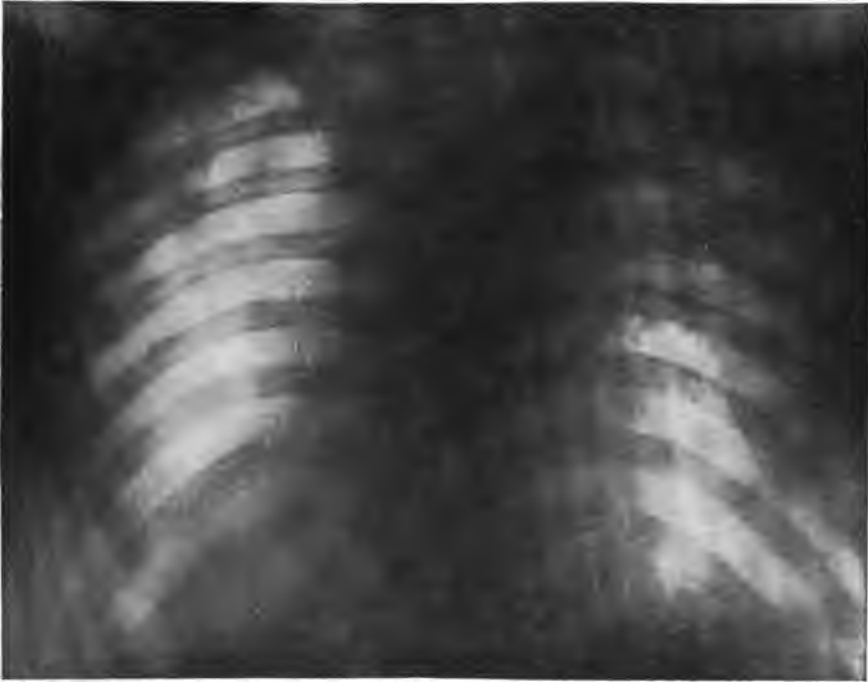


Fig. 3.—Case III, Showing extensive tubercular process.

satisfy herself and husband, I administered the X-rays for a short time but discontinued them as I could see no benefit in her case, and I have relieved her by other means

No. 3, is a case that has been dismissed for over a year. He has become a successful farmer or rancher, as they are called in Colorado. He has held his own in spite of much hard work and "baching it" on his ranch, and when you look at his skia-graph, you will have no trouble in making out a very knotty lung. This gentleman had been in Colorado for over one year

doing the best he could to get well, but had lost over thirty pounds and was thinking seriously of returning to his eastern home and giving up the fight when he came to see me. He gained nineteen pounds the first month, and in three months weighed 168 pounds, being more than he had ever weighed before.

No. 4, Miss W., from Indiana, had been in Colorado for about one year when I first saw her and constantly under the

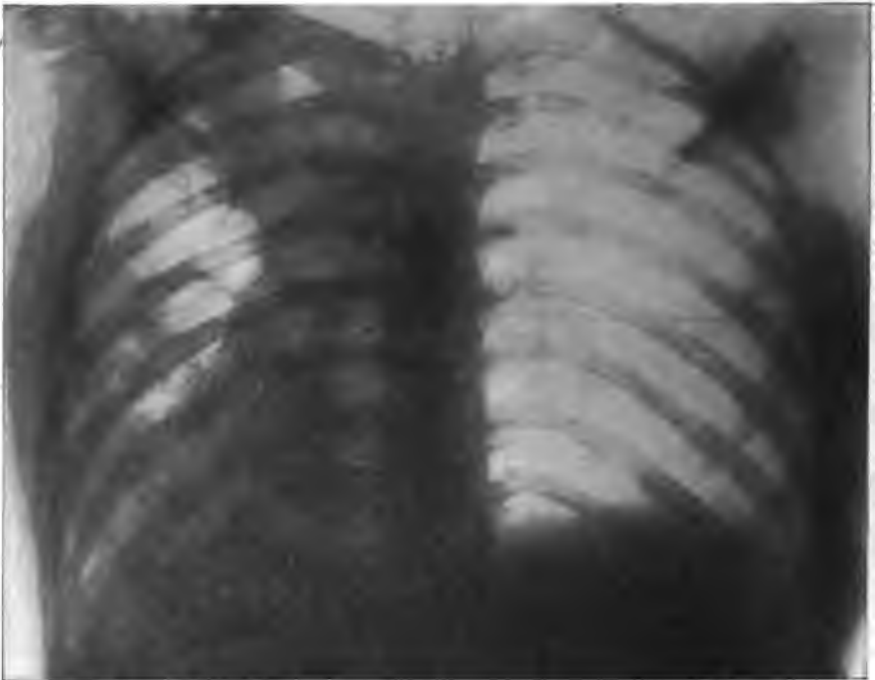


Fig. 4.—Case IV, An advanced tubercular process.

care of one of the most accomplished and successful physicians in the city of Denver. She had a distinct chill and rise of temperature almost every day during this period. She was confined to her bed when I first saw her and had a temperature of 103° in the afternoon. Her physician had advised her to return home, saying that neither the climate nor he himself, had done her any good, and she had just as well return. Arrangements were all made for her return home in a few days when I saw

her. I advised her to let me see what I could do for her in one month, and if we made no improvement she could return home: I told her frankly that I thought her physician was correct, and that without the X-rays she had no hope for recovery. She is to-day doing splendidly, has gained eighteen pounds, and the



Fig. 5.—Case V, Showing extensive tubercular involvement.

lung consolidation has lessened considerably, but the cavity near the center of the left lung is yet unhealed. The patient is dismissed from treatment for the present, but kept under observation. She is up and allowed to take moderate exercise, being now within six pounds of her highest previous weight. The results so far are very satisfactory.

No. 5, Mr. T. of Atlanta, Ga., had been in Ashville and Denver together for about two years, and had lost weight. He had an annoying cough and suffered a good deal from the presence of chronic pleuritic adhesions. The skiagraph shows the condition. He now weighs more than he ever weighed before,

and is back at the present time at Atlanta on a visit, in a very satisfactory condition.

No. 6, Mrs. M., had been in Colorado for over one year, normally a large, robust, and stout lady, but contracted tuberculosis from a sister, who died with the disease. She continued to lose weight and did badly after coming to Colorado.

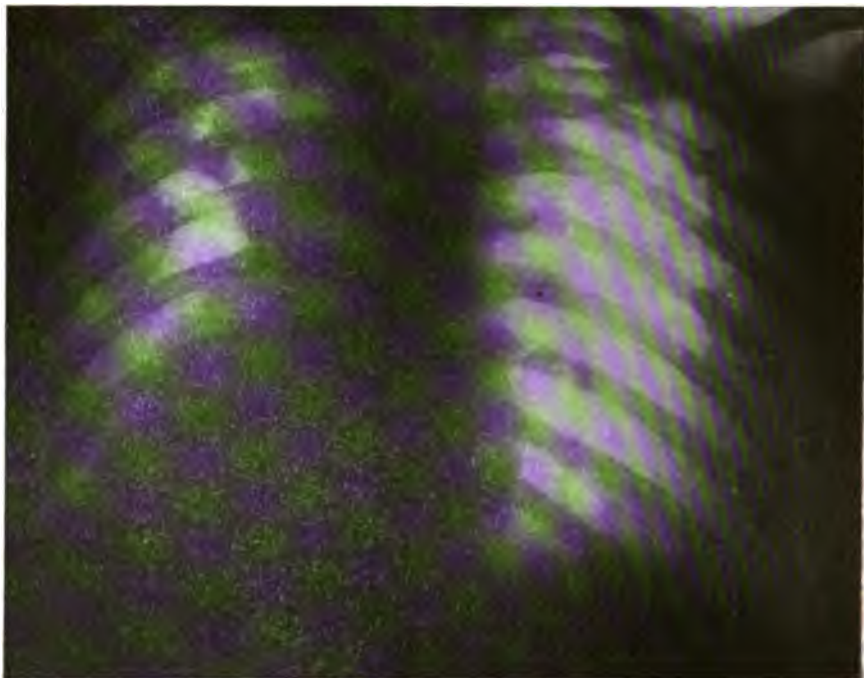


Fig. 6.—Case VI, Showing marked involvement.

Her skiagraph shows her condition. She was treated three months and was allowed to return to her home in May. She reports a very flattering condition of continued improvement. This case has been very satisfactory in every way.

Now, in closing allow me to say, as a physician, I have brought every agent at my command, medicinal and otherwise when indicated, to help the X-rays in all my work. That it has succeeded is due, I believe, more to the X-rays than to any one agent. Climate, it is true, helps a great deal, but you will notice nearly all cases reported above were failures, as far as climate and medicinal agents were concerned, until brought

under the influence of the rays. I could report scores of cases, but these six will be sufficient to illustrate the points intended to be brought out in this paper.

Discussion.

Dr. Martin L. Barshinger, York, Pa.: It will be gratifying to those interested to know that this year a special effort was made by the Pennsylvania State Medical Society to put the subject of physio-medico-therapy in its proper place before the profession at its last meeting at Bedford Springs. I had the honor to present a paper in the Symposium on High Frequency and read my paper there last Tuesday on the High-Frequency Currents in Pulmonary Tuberculosis. It occurred to me that it might be encouraging to the workers in this field to have these persons appear here in evidence, as the results of treatment appear nothing less than remarkable.

My first case, which I look upon as my test case, is apparently cured. This young woman was referred to me last August and gave me the following history: In May, 1904, she developed cough. She saw a number of physicians and finally went to a man with a local reputation in my town in the treatment of this disease, who told her that she had a cavity and had perhaps six months to live. This frightened her and she went to another physician who had her sputum examined and finding tubercle bacilli put her on raw eggs and milk and had her sleep by herself in a room with wide-open windows. She held up fairly well under this treatment until some time before coming under the high-frequency treatment. When I first saw her she felt that she had gone back more than at any other time, and that if something were not done, she could not hold out much longer. She had a great amount of cough, profuse expectoration, chills, and sweats. She continued the treatments with the high-frequency currents until December, 1905. Her present condition shows that she has gained twenty-six pounds, has no cough and no expectoration. I have been unable to get a specimen of the sputum for examination. She says she never felt better in her life. Her appetite is good, she sleeps well and is normal in every respect.

Another case is that of Dr. S., a practitioner of medicine, who contracted the disease in 1897. His sputum was examined in November of that year by Dr. Simon, of Baltimore. He has a cavity in his right middle lobe and both apices are affected. When he removed to York he tried what rest would do. The slightest exercise sent his pulse up to 140 to 150. His present condition shows a pulse of 96; temperature normal on the last four days of last week. He had no appetite for a year before beginning treatment. Now his appetite is restored and he is feeling better than he has felt in eighteen months.

The method I am using is the current from a 12-plate static machine and resonator.

I feel very skeptical as to any cataphoric effect. I question whether we can drive the remedies in through the skin, muscle, fascia, etc. The results obtained I attribute to improved metabolism and improved pulmonary circulation.

Dr. Morris Weil Brinkmann, New York: The subjects of immunity and infection have been quite extensively gone into by the author. We do not know all of the defenses which the body possesses. Many of the observers and writers on this subject have described a great many defenses heretofore unsuspected. Independently of phagocytosis there may be other defenses, and if anything can be demonstrated whereby we can control any forces in the body whereby the pathologic processes may be influenced it is most important that we know it.

While upon the subject I would like to say that I am decidedly opposed to the highly albuminous diet in the treatment of conditions associated with irritation of the mucous membrane. Some of the gentlemen who are very free in their commendation of the albuminous diet have pushed the recommendation of the use of eggs to three dozen a day.

In the examination of feces of highly albuminous fed patients sulphureted hydrogen is a marked constituent of the stool.

In such cases acute glossitis has been exceedingly common, and in one case I have seen death attributed to this sulphureted hydrogen poison. That is only a practically inorganic poison, but the forces of organic toxic nitrogen compounds developed in the intestines of people unable to digest, should make us see that we do not allow to become developed a culture field in the intestines.

Dr. Henry W. Frauenthal, New York City: I take exception to what Dr. Brinkmann has said about the giving of albumen in the white of egg irritating the membrane of the lung.

Dr. Brinkmann: I spoke of a chemical poison with the reaction and involvement of nerve trunks and septic deposits and these have been demonstrated to be present and can be produced in animals. It is merely necessary to read the reports of experiments which are common in the literature of the subject.

Dr. Sinclair Tousey, New York: In regard to the development of an antitoxin or similar body from exposure to X-ray one or two thoughts have occurred to me. It has been found experimentally that if a small animal is exposed to a very severe radiation of the X-ray, the serum from any of the animal juices extracted from that portion exposed injected into another animal will be followed by the local development of a severe X-ray burn. In other words, the parts exposed to the X-ray, if injected into other animals, contain the substance which will produce an X-ray burn, so that the reaction can be

exercised without the animal ever having been in the X-ray room at all. These reactions which we see in patients with cancer and other exanthemata after unconscious exposure to the X-ray are due doubtless to the liberation of some toxic body. I am firmly convinced that in the cases of cancer which we relieve or cure that the relief is due not to the X-ray searching out into all the tissues to kill cancer germs, but due to a constitutional effect from the substances introduced locally. In operable cancer in which the whole system must be saturated with the cancer cells if benefit is secured it must be by the constitutional effect of the local irradiation.

Dr. William Benham Snow: I feel that Dr. Gibson is on the right track. Dr. Tousey suggested the presence of other toxins liberated, but that conditions arising from injections bring X-ray burns is hypothetical and improbable.

The symptoms of reaction and rise of temperature referred to by Dr. Gibson undoubtedly point to the action of the X-ray upon other germs as in the resolution of other processes. The fact that the X-ray is apt to be followed by an early rise of temperature indicates the first reaction, either from toxins liberated, or an increased phagocytosis.

I do not agree with the author in his idea that the X-ray induces an increased hyperemia, though he may be right. I have always been led to believe that the X-ray produced the opposite effect. By his method he more likely gets a destructive action on the germs and the reaction is due to a toxemia, for he uses the rays in large doses. I have watched the result from the X-rays in some cases myself. One patient who came under my observation had a large tubercular gland of the neck and every indication of advanced general pulmonary tuberculosis with mixed infections. In five days under treatment with the X-rays he had lost almost all the symptoms of mixed infection. In three weeks with the X-ray and high-frequency current the man had greatly improved, gaining nine pounds.

Dr. Edward C. Titus, New York: We hear much of the use of X-ray in the treatment of tuberculosis in various tissues of the body, but we get little idea of the technic of application. There is considerable diversity of opinion regarding application, dosage, and other technical considerations, and I would ask Dr. Gibson to give us some idea of his method of application; whether he uses a high or low vacuum tube; the distance from the subject he places the tube, and the duration of each application. I understand that he considers the X-ray an adjunct to the general treatment of tuberculosis.

Dr. Frederick De Kraft, New York: In some of the cases of tuberculosis I have treated in which the high frequency seemed to have no effect in reducing the temperature I have been able to control the temperature by the X-ray, using a tube with a

good deal of penetration at some distance from the body. It has so far controlled the temperature better than any other means I have used in cases of advanced tuberculosis.

Dr. Gibson (closes) : I feel obliged to the gentlemen for this discussion, and am rather surprised to have been let down so easily. My method of treatment has been described in previous papers and I therefore did not go into the details of treatment.

I would first call attention to the skiagraphs. The principal point is the almost uselessness of the X-ray in light cases, the great benefit being derived in the apparently hopeless cases. This is different from anything claimed by any other agent. In the case represented by the skiagraph which I now show, the patient gained eighteen pounds and had no chill after the third treatment by the X-ray, and she is not the only one of that class. As physicians we know that tuberculosis can be cured, that there is no disease that people may get well of, as tuberculosis; in fact, it is a hard matter to keep tuberculosis from getting well, and it is always somebody's fault when it does not get well. There must be a combination against the patient to keep these agents from saving every patient who contracts tuberculosis. One or two cases add nothing to the value of any specific methods in the treatment of tuberculosis; you must have a large number to prove anything, and any agent to prove itself valuable must be subjected to the test of time.

In technic I use a tube of low vacuum with a three- or four-inch spark-gap from the coil and that is the special part of the treatment. I do not think much of the X-ray from a static machine in treating pulmonary tuberculosis. I have from five to ten milliamperes flowing through the primary coil if I can get a coil that will stand the exposure for ten minutes. I use the ordinary Mueller tube. I believe the secret of my success is in the coil with the large amperage. It gives a splendid ray and one which will take a skiagraph in from thirty to sixty seconds. Then I reverse the patient at each treatment to prevent burning. The distance is from fourteen to eighteen inches from the chest. I give about three treatments a week and in from two to three months I begin to get my toxemia. Then we need to quit. Sometimes in the exacerbation of fever it is difficult to tell whether it is due to the rays or the disease. With this treatment I administer fluorescein before each X-ray treatment to get the benefit of internal fluorescence as suggested by Dr. Morton, which I think has added materially to my success.

WHEN IS ELECTRO-THERAPY INDICATED? *

BY ALBERT C. GEYSER, M. D., NEW YORK,

Clinical Instructor in Radiography and Radiotherapy at Cornell University Medical College; Lecturer on Electro- and Radiotherapy at the New York Polyclinic; Member American Medical Association, American Electro-Therapeutic Association, New York State Medical Association, Harlem Medical Association, Medical Society of the Borough of the Bronx, Medical Society of Greater New York, Manhattan Dermatological Society, etc.

In order to answer that question, it will be necessary to have an appreciation of what is meant by the term electro-therapy. The simple term electricity comprises all the various forms and modalities known to the physician. According to Rockwell, the term electricity is in a way generic and includes a wide variety of manifestations. In medicine, however, we are content with enumerating three principal sources as the direct, the induced, and the static currents. Each of these main currents is capable of extensive subdivision. We thereby find that we have no less than about thirty modifications of the one term electricity, not to mention the various forms of radiotherapy. This at first seems bewildering; nevertheless, each modality has its own limitations and the indications for their applications in therapeutics are almost absolute and unerring. It must not be inferred that these various modalities sprang up like mushrooms over night; on the contrary, nearly every modality and its specific indication and employment in therapeutics is the result of patient labor extending over years of time. Neither is it necessary to point to foreign lands for investigators and advocates of these modalities, for inseparably stand engraved upon the minds of electro-therapeutists the names of Morton and cataphoresis, Newman and electrolysis, Snow and static modalities, Brinkmann and harmonic vibrations, Morton and the wave-current, Cleaves and light therapy. These, and their number is legion, might be cited as the pioneers of electro-therapy. They tried and tested, they became convinced themselves, they convinced others how and when to apply electro-therapy.

I know of no better way of comprehending electro-therapy

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than by comparing it with some well-known drug, for instance opium. We find that opium contains no less than eighteen different alkaloids, each possessing a specific virtue of its own. Then we have twelve official preparations of the crude drug. We need go no farther, for we have thirty specific substances. Each is especially prepared and has its own specific indication as well as its specific physiological effect upon the human body, yet all emanating from the one source, "opium."

If we compare the term electro-therapy to opium therapy, we will have no difficulty in understanding that we may have thirty or even more modalities in our electrical applications, each with a different indication and physiological effect, the same as the thirty preparations of opium. It may be reasoned that opium is a highly compound organic body, therefore easily divisible into its component parts.

Mercury, on the other hand, is an inorganic element, yet we have twenty-three well-recognized preparations of this one element. It may further be said that electricity is neither a compound body nor an inorganic element, but simply some attribute of bodies or elements; so is heat, neither a compound body nor an inorganic element, but like electricity demonstrable in a variety of manifestations from such a degree as to fuse the most obdurate metals and again to freeze into a solid mass the liquid metal mercury. Every degree of heat has its own specific properties and these properties cannot be substituted. The same property of heat that will melt ice will not freeze water, yet only an imperceptible difference of one degree exists.

We require no further comparison to understand that electricity as used in medicine may appear in thirty or more modalities, each one produced in a specific manner with its own specific properties, its specific application and specific therapeutic results; that it is not at all a mystery but rather a highly scientific and subtle agent capable of doing much good when properly selected and applied, yet like a double-edged sword, capable of serious harm if improperly made use of. All that may be said of drugs applies equally to electricity and *vice versa*. Electricity like any other single agent is not a panacea for all the ills that flesh is heir to. It has its indications as well as its limitations.—When, then, is electro-therapy indicated?

Before any therapeutic measure is indicated, we must have

a clear conception of the status of the disease. We must have an exact knowledge of the pathological changes that have taken place in the economy, and what is of equal importance, we must know to a certainty the physiological effects of any measure we desire to make use of. Unless these factors are constantly before us, our therapeutic measure, no matter what its name may be, is almost sure to result in failure, if not doing absolute harm. To make my position clear let us imagine a patient with all the symptoms of an acute biliary colic. The patient is seized with a piercing, agonizing pain in the region of the gall-bladder, the abdominal muscles are cramped and tender, the expression distorted and anxious, the patient exhausted, wringing, twisting, and turning, begging for relief or death. There are two conditions presenting themselves. The cause cannot be removed for the present, but the agonizing pain must be subdued, and at once. We know of nothing in the whole field of electro-therapy that can as successfully cope with this condition as the simple injection of 1-4 of a grain of morphine, and in a few minutes our patient is relieved and falls into a quiet and peaceful slumber, giving us an opportunity to apply local heat to facilitate the onward passage of the stone. Here, then, in an acute condition of this kind, *materia medica* certainly triumphs over electricity. It demonstrates the clearness with which a certain remedial measure is indicated and we have the assurance of results equally gratifying.

Let us suppose another patient suffering from an acute attack of supraorbital neuralgia or any other neuralgia. The main condition that confronts us is as before, the pain, which could be treated again with morphine. But when we reflect a moment, we are forced to the conclusion that the relief of pain is only temporary or will last as long as the effect of the drug does, when the dose must be repeated as well as increased, and as a result of our therapeutic measure we would substitute a worse condition for a bad one. Here, then, morphine should not be used, neither are the coal tar products indicated, but the direct constant current, the positive pole applied over the painful nerve, the negative as near as possible to the spinal origin of the nerve with a current flowing through the meter of not more than three milliamperes. The pain in the nerve will cease within two to three minutes; the treatment should continue for about five minutes and be repeated daily for at least one week,

although the neuralgia may never appear again after the first treatment. It will hardly be necessary to call special attention to the fact that the exciting cause in all cases must be sought and if found removed.

Still another patient is suffering from an acute facial paralysis (Bell's palsy). The immediate condition confronting us is the one-sided paralysis of the muscles of the face. Some anatomical or pathological change has taken place in the nerve brought about usually by pressure in its bony canal which prevents these fibers from performing their function. Our therapeutic indication is some means whereby we may absorb that which is causing the pressure. The first drug that suggests itself is potass. iodide. The next drug required would be strychnine to stimulate muscular contractions, but now we are getting into deep water. We administer K. I. because it is an alterative, and we subject the whole body to this alterative action of the drug when less than 1-5000 part of the body requires it. Then we give strychnine to stimulate a few nerves along with those all over the body that do not require stimulation.

Let me quote a few medical authorities for two reasons. First, to show that nearly all have had good results from electricity in some one of its forms. Secondly, the uncalled-for medicinal treatments advocated.

Wood and Fitz recommend leeches, blisters, salicyates followed by iodides, *electricity* early and mild.

Barthelow advocates pilocarpine for rheumatic cases.

Rosenthal—vapor baths, tenotomy of contractures.

Gowers—inunctions of morphine oleate.

Osler—counter-irritation, massage, and iodides, and the *direct continuous current*.

Strumpel—*weak, direct continuous currents* daily, later *peripheral galvanization* or *faradization* of muscles; he mentions no drugs.

This, then, is another case in which some other therapeutic measure seems more indicated than drugs. I know of no one agent that has given more uniformly good results than electricity in this form of lesion. I would suggest here that no drug be used, but instead apply dry or moist heat to the mastoid region for the sole purpose of increasing the local blood supply. Next with the weakest current from a secondary in-

duction coil cause contractions to take place of those muscles only that appear paralyzed. Should degenerative changes have progressed so far that no contractions take place with this current, then the direct continuous current must be resorted to. This seldom fails. The weakest current that will cause the nerve to transmit impulses is the current indicated. In other words, the nerve and muscle must be made to perform its function with the least amount of disturbance to itself or any other tissue. This, either one or the other electric modality will accomplish.

The previous cases considered were lesions of either nerves of sensation or nerves of motion. Besides the immediate involvement of either nerves of sensation or nerves of motion, we have a large array of conditions where simply function is changed or perhaps entirely arrested. The functional disorders usually are the accompaniment of what is termed the chronic stage of any given disease, and this brings us to the consideration of chronic diseases generally.

If we stop to think for a moment, we realize that in order for a disease to reach the chronic state, it must have passed through the acute and subacute stages without treatment or in spite of treatment. The general system more or less accommodates itself to the results of a number of abnormal conditions; even the heart readily enlarges to overcome either impedance in the blood vessels or leakage of its own valves. The nervous system, though, seems to be obliged to bear the greatest burden here, and the numerous functional neuroses are the result. I will mention just a few of these functional neuroses where electricity is the remedy indicated.

A child is suffering from acute articular rheumatism (I do not like the term, but it designates a condition and we know what it means). The little patient is treated either with the alkaline method or some of the salicylates and iron are prescribed and more or less abatement of the symptoms takes place. In a few weeks or months, the same symptoms reappear. They are a little more prolonged, require more energetic treatment with calomel and salines, and again a semblance of recovery takes place, but a few weeks later one of the functional neuroses makes its appearance; namely, chorea. It must not be supposed that chorea always follows every case of acute rheumatism. On the contrary, I maintain that the

coexistence of chorea and a history of rheumatism is simply incidental. The various attacks of rheumatism have simply undermined the system and toxins of various kinds now circulate in the blood stream. That makes it possible that we have the symptoms of chorea presenting themselves.—What then are the therapeutic indications?

Ziemssen considers arsenic best for idiopathic cases.

Bouchut claims to have cured four hundred and thirty-seven cases in an average of ten days by eserine 1-32 to a half grain for a child seven to twelve years old.

Sinkler employs ether spray or ice to the spine in some cases, best in adults.

Weir Mitchell gives sodium salicylate, probably best in rheumatic cases.

Trousseau employed tartar emetic pushed to tolerance for the worst cases. He usually gave strychnine up to 1 1-5 grain daily.

Fothergill considered strychnine most useful when the cord seems lagging behind in the general evolution of puberty.

Tanner preferred cold shower baths and iron.

Da Costa recommends iron bromide.

Turnbull gave aniline sulphate about a grain thrice daily and acetanilide has been highly praised.

Niemeyer suggests cups or leeches to the sensitive vertebræ.

Radcliffe preferred iron iodide.

Bouchut gives chloral 45 grains daily.

Joffroy employs chloral with cold packs in grave cases with energetic rubbing, castro-veratrine two or three granules every one-half or one-quarter hour until better, or the stomach rebels. In the latter case, add two granules of codeine to each dose. If no better, stop a few hours and begin again with one granule rapidly increased.

For pain, cannabin tannate.

For the heart, digitalin or strychnine.

For digestion disturbance, hyoscyamine, quassin, and pepsin.

For anemia, iron valerianate and arsenious acid; should the patient survive all this, then for insomnia he gives camphor bromide and ergot.

Burggræve—strychnine, hyoscyamine, and the arseniates of iron, zinc, etc.

To brace up the nerves and muscles, a granule of each two

or three times a day, and last, but not least, hydrotherapy and *electricity* are useful.

Your attention must be called to the fact that from all the authorities thus far mentioned, only one advocated electricity, all the others relying mostly upon such drugs as chloral to quiet the muscular twitchings, and arsenic as an alterative. Because practice has shown that a case of chorea improves under the administration of arsenic and iron, just why we do not know. All cases, however, do not improve and some rebel early against arsenic. Here, then, is a condition that calls for one or the other electric modality. My own preference is the high-frequency, high-potential current. It does not matter whether furnished by the static machine or a modern high-tension coil outfit. For electrodes, I use the glass vacuum or glass filled with a solution of salt water. The discharge from such electrodes applied to the skin causes a reddening, a counter-irritating action causing congestion upon the surface and anemia to the underlying structures. When this is applied for fifteen minutes every day, or even twice daily to the entire length of the spine, the nervous twitching, which we term Sydenheim's chorea, will vanish in the course of one week or ten days, when the number of treatments should be reduced, but the individual treatments lengthened. This must be continued according to the chronicity of the case for from four weeks to as many months.

Another functional neurosis is epilepsy. My opinion is that in epilepsy, we are more frequently dealing with a habit disease, a reflex phenomenon which can be brought about by any agent capable of irritating the susceptible psychic condition of the patient. This may be a simple error of accommodation or refraction, a gastro-intestinal disturbance amounting to an autotoxemia, a phymosis, nasal polypi, anal fissure, tape and round worms, etc., etc. If the cause can be discovered, of course it must be removed. Sometimes, however, the cause cannot be discovered or it may have been removed, yet the habit still remains and even insignificant causes are able to produce in a susceptible patient the epileptic attacks. Here, then, symptomatic treatment is indicated. Medical authorities evidently have had no experience with electricity and little or no success with drugs.

A. H. Hamilton gives large doses of bromides at bedtime. Leaman prefers nickel bromide.

Da Costa gives ergot and nickel bromide. The bromide and ergot are prescribed, one making the spinal reflex centers less susceptible, the other contracting the arterioles of the cord, hoping thereby to remove stasis or congestion, but we must remember that every dose of bromide passes through the whole system and not only does it abolish the hyperexcited reflexes, but the normal ones as well, and those of you who are in the habit of seeing many patients under bromide treatment, know whereof I speak when I say that the treatment of epilepsy by bromides or similar life-destroying agents is worse than the disease itself.

Here, again, in electro-therapy, we find a sheet anchor, either the high-tension induced, or the high-frequency currents are indicated. Both of these currents are a positive sedative to the terminal filaments, at the same time acting, especially if a mild treatment is prolonged; as a gentle counter-irritant, causing a local dilatation of the peripheral circulation, and so relieve the congested central nervous system, accomplishing exactly the same results as the drugs mentioned without the unnecessary effects upon the rest of the economy.

Neurasthenia and hysteria are two functional disturbances, usually with undiscoverable causes. Symptomatic treatment again is indicated. The symptoms are, however, so numerous that nearly the entire materia medica has from time to time been called into service only to acknowledge its helplessness; yet how surprising are the results from a few static charges upon the insulated platform. The patient in the course of fifteen to twenty minutes is converted from a state of deep depression to one of well being, or from a state of excitement to absolute calmness, so that it not infrequently happens that a patient has fallen asleep while under treatment.

Let us spend a few minutes' thought to see how this all comes about. The standard text-books tell us that neurasthenia is caused by mental worry or emotions, sexual excesses, alcohol, tobacco, and other stimulating agencies. Assuming then that over-stimulation is the cause, the same text-books inform us under treatment, the internal remedies indicated are arsenic, strychnine, iron, phosphorus, and quinine, each one an acknowledged so-called tonic to the system. Is it good logic

when a man has imbibed just a little too freely of alcoholics and has become in consequence highly nervous and easily excitable, to offer him still more alcohol until the stage of depression asserts itself, and when he is no longer able to receive and respond to external impressions consider him cured of his nervousness or his hyper-excitability? Krowenthal argues that neurasthenia and hysteria cannot be regarded as nervous affections. It is the varying morbid reaction of the cells constituting the individual. Treatment should aim to influence the morbidly reacting cells by changing the environment and by strengthening the cells,—the benefit from which has long been established empirically.

Fortunately, in electro-therapy, we possess an agent, especially in the static current, which is capable of setting up in the tissues a cellular massage. An agreeable impression proceeds from the periphery to the center, the normal rhythm or vibrations of the system which have been disturbed, and are now in discord, soon come under the influence of the static charge and harmony is re-established, by these impressions upon the terminal nerve filaments. So gentle are the impressions because the air surrounding the patient is used as the electrode that not even the hand of the operator offends the already oversensitive organism of the patient. Static insulation then is an anodyne and a restorative, and should the patient later really require a so-called tonic, then where is the tonic that can equal the Morton wave-current from the static machine?

Another class of diseases are those of the glandular system such as Addison's disease and tubercular glands of the neck. Materia medica has nothing to offer in either of these affections. Serum therapy in Addison's disease is just now receiving attention at the hands of John Rogers of New York. Surgery has accomplished something here; but when seen early offer an excellent opportunity for electro-therapy. If a tubercular gland has not yet broken down, the X-ray will certainly contract that gland and all the glands in that neighborhood, thereby shutting in and making a further spread of the disease impossible. But, if the gland has broken down or is about to do so, then the metallic cataphoresis of an electrode of zinc dipped first in dil. sulphuric acid and then in mercury according to the Massey method, is certainly a treatment *par excellence* to be used in conjunction with the gland-contracting power of the X-ray.

In certain benign affections of the skin, one or more of the various electric modalities is unquestionably the therapeutic measure indicated. One of the most common lesions of the face is acne, and yet how difficult to cure. Acne in one of its many forms is usually dependent upon a toxemia of gastrointestinal origin, or it may be due to reflexes or circulatory disturbances associated with the menstrual functions. Of course, always remove the cause, but the sebaceous glands have acquired a habit or have lost their power of contraction to the normal by their continuous dilatation, and though the cause has been removed, the lesion still persists, or upon the slightest provocation returns. Again symptomatic treatment of a local character is indicated. The over-activity of the gland must be inhibited. There certainly is no agent known to-day that can accomplish glandular inactivity quicker than the Roentgen ray. Only a few exposures are required to cause almost a complete inhibition, and as soon as the sebaceous material ceases to accumulate, the glands contract leaving small nodules of simple local congestions which are equally soon absorbed by the application of the high-frequency discharge from the vacuum electrodes. The high-frequency discharges act as powerful local counter-irritants, increasing the local circulation for the purpose of absorbing effete material and supplying the parts with nutrition.

A few malignant affections such as epithelioma, rodent ulcer, lupus vulgaris, etc., have yielded to the influence of the Roentgen ray with cosmetic effects so much superior to any other method of treatment that there exists no room for choice. The question is often asked, Do the Roentgen rays kill or destroy the germs causing the disease? In my opinion, they do not, but by their vibratory influence so affect the cells exposed to their action that they regain their inherent power of destroying the germs and recovering from the disease.

It was not the intent of this paper to bring before you anything new, strange, or startling, but rather to act as a stimulus to someone who either has not yet tried this one therapeutic measure, or to one who by a false process of reasoning may have become discouraged with his results. It has rather been my endeavor to answer the question, "When is Electro-Therapy Indicated?"

Ignoring all fine technicalities, I have explained what is

meant by the term electro-therapy. From certain groups of ailments, a few were selected and the rationale explained. It is not to be inferred that electro-therapy is good for what ails you, or that it should be used to the exclusion of any other therapeutic measure. For again I repeat, three things are absolutely necessary for the successful physician:

First.—Remove the cause.

Second.—Treat the patient and not the disease.

Third.—Before selecting any therapeutic measures, think—and then use common sense.

Discussion.

Dr. Francis B. Bishop, Washington, D. C.: I think Dr. Geyser is on the right track and he has made a great many valuable suggestions. Naturally, I do not agree with him in all his remarks, for we are here to disagree and to bring out different points. I do not believe that the wave-current of which he speaks is a tonic, but that it is absolutely a stimulant. The question arises, do these cases of chorea all require stimulation? Chorea is not always due to congestion of the cord, but to nutritive changes in the cord and in the anterior cornu. The ganglia of the posterior roots act directly as nutritive centers to the fibers that they control and reflexly to the fibers of the anterior cornu. There is no set of ganglia in the whole body so susceptible to treatment and which we can treat so easily as the ganglia of the cord. In these cases I have found that to establish nutrition there is nothing like the modified continuous current. If the choreic movements are in the upper extremities the current is applied directly to the cord governing the cervical plexus. The function of that part of the cord is highly specialized. If we can in this way increase the nutrition we can very markedly modify the choreic condition. Of course it is due to auto-intoxication very frequently, and then when the cause is determined the proper medicinal treatment and diet should also be applied. Neurasthenia may be due to a great many different conditions and they do not all respond in the same way to electrical treatment. Therefore the current must be suited to the individual condition. We may find one man suffering from neurasthenia due to auto-intoxication from the too frequent consumption of nitrogenous food with too little exercise. Another man may be a brain-worker and take too little nutrition and there may ensue neurasthenia from cell exhaustion. In both cases we have cell exhaustion due to diametrically opposed conditions. We may have neurasthenia the result of infectious disease, such as grip, typhoid fever. In all these conditions we should apply the suitable current for

the individual case. The condition of nervous indigestion is reached through the pneumogastric nerve.

The question arises whether we shall use the negative or positive current; one man may stand 3 ma., another twenty-five. While it is very nice to systematize the treatment of nervous diseases by electricity, it cannot be done in every case. A great many cases will not stand the static current, not even the static wave-current, at first.

I think Dr. Geyser is on the right track, but I do not agree with him altogether as to the application of static electricity in nervous conditions. There should be ascertained the exact kind of current suitable to the case.

Dr. G. Betton Massey, Philadelphia: I have been much interested in Dr. Geyser's paper, which is a very clear-cut presentation of many facts. As the last speaker said, however, we are here for mutual friction and the brightening of our faculties. One little point in reference to the doctor's mention of cataphoresis in tubercular glands I object to, that of the association of that method with the X-ray. I doubt whether Dr. Geyser has tried cataphoresis. If so, I think he would not have added the second portion of that phrase. The zinc-mercury cataphoresis will cure any case of even very extended tubercular infiltration of the glands of the neck. Under these circumstances the use of the X-ray is unnecessary, and may have rather a deleterious effect upon the healthy tissue.

I think that part of Dr. Bishop's difficulty in the differential application of electricity would be cleared up if he remembered the dictum of Apostoli, that in the static spark we have a means of differentiating between neurasthenia and hysteria. Apostoli pointed out that neurasthenics did not well stand static modalities but that the hysterical patients will stand all that can be given to them. In a recent case sent to me from Trenton, a woman of thirty-five and so well nourished as to make a diagnosis of neurasthenia uncertain, I employed at first the rest cure for neurasthenia. But the constant current and insulation were most insufferable to her. The method had to be abandoned. I then made the diagnosis of hysteria rather than of neurasthenia by subjecting her to the static sparks, which were not only well-borne, but seemed to be most grateful to her. Under the use of this modality in simple office applications she has rapidly improved.

Dr. Herbert F. Pitcher, Haverhill: I was much pleased with Dr. Geyser's paper, which covered a large territory. I think it is easier many times to tell when to use electro-therapeutics than to choose the particular modality. Although I have been practicing electro-therapeutics for fifteen years I find a good deal of trouble even now in choosing the right current. In the treatment of rheumatism I have found great benefit in using mechanical vibration and radiant heat. Many times the two

combined eliminate the poisons quicker than any other method.

Dr. Charles Am Ende, New York City: In chorea which we assume is produced by a hyperemic condition it seems to me that static stimulation would not be correct. I have used small quantities of nitroglycerine.

Dr. Morris Weil Brinkmann, New York: Personally, I am very thankful to Dr. Geyser for his paper. I think the remarks which have been made were not in the form of a discussion of the paper, but in reality statements of the treatment which the different gentlemen employed for the different conditions as they conceived them. This was not in the spirit of the paper. Dr. Geyser made certain statements which were the cause of the reading of that paper and the paper has fulfilled the object for which it was written. It has described the folly of so many therapists and authorities of prescribing a long series of measures or medicinal agents of a pharmaceutical or chemical character where there was no possible means of analyzing the effect of these agents. Dr. Geyser has analytically described why electro-therapy is indicated, and when it is indicated, in a certain number of cases, and he ought to be congratulated for doing that thing. He made a collection of authorities upon the treatment of one condition and also the statement that if the patients survived these things, possibly electro-therapy might be indicated. Criticisms of methods of treatment are not in line with the paper. Dr. Geyser's statement that we should not treat the disease, but the patient, covers the ground very beautifully and is a very valuable suggestion.

Dr. Francis B. Bishop, Washington: I do not want the society to think for one moment that I was criticising Dr. Geyser's paper unfairly. I said that the paper was written in the right spirit, but as I understand it, the subject is, where shall we use electro-therapeutics? The doctor made some remarks to which I did not agree. I, in a friendly spirit, gave my view and I did not intend to criticise the paper, except upon those points. I stand open to criticism myself. In fact I invite it. No matter how much we know, or think we know, someone else knows just as much, and perhaps more; and only by having our ideas and opinions straightened out and leveled down by honest and open criticism, can we hope to arrive at the truth.

Dr. Brinkmann: I did not intend that this should be personal for anyone, but I did want Dr. Geyser's paper to receive the thoughtful attention of the members in the direction in which it was evidently written.

Dr. Emil Heuel, New York: While I look upon tubercular disease of the glands as a local condition which is often followed ultimately by complications elsewhere I do not believe the local treatment will cure the general tuberculosis, as stated by Dr. Massey.

Dr. G. Betton Massey: Dr. Heuel's statement sounds very

plausible, but his facts are not there. Given a case of tuberculosis, it has been proven in every case that I have had, that if the worst focus is destroyed by sterilization in its center (very gently with two or three milliamperes three times a week of fifteen-minute sittings) that the patient will quickly regain a healthful appearance and take on weight. In the case of one young lady who had had twenty cutting operations on one side of her neck resulting in terrible scarring on that side, I began to treat the most manifest tumors on the other side. The treatment was continued for a year and a quarter, the case being an extremely bad one, but to-day she is perfectly well. She has now a good color, and if there were tuberculosis germs in the other portions of the body they have disappeared. The definite fact is there: that after the cataphoric destruction of the worst foci of infection, coupled possibly with the effect of the mercury on the general system, a cure of the tuberculosis of the whole system was secured.

Dr. Geyser (closes): Dr. Bishop started off by saying that he did not agree with me. I do not believe that there are any two men within my hearing that would absolutely agree in any one given case. In fact, if we all agreed, these meetings could be immediately abandoned; for it is by the diversity of opinions that we arrive at the truth. Dr. Bishop evidently got that somewhat false impression which I tried so studiously to avoid in my opening remarks. I stated that I did not come here to teach those who knew or thought they knew when to use electro-therapeutics. I simply intended the paper for those who had not tried electro-therapy. While I take the discussion in the spirit in which it was given, it was not a discussion of the paper at all, but the individual treatments.

Dr. Bishop would not in chorea use the Morton wave-current, because that is a stimulant, but he did say that he used the continuous current. So long as the treatment has been discussed and so long as the path has led away from the paper, then might I ask Dr. Bishop by what process of reasoning he uses the galvanic current? The idea of my paper was to use reason and thought and not employ a method because other members used it, or because by using it there were good results. That is empirical treatment. The object of my paper was to develop the reasoning power of the person that he might have some tangible idea why he uses a thing, what it will do and what he intends to accomplish.

Dr. Massey objected to the statement concerning the use of the X-rays in tubercular glands. I have treated a great many clinic cases of tubercular glands according to the method laid down by Dr. Massey. Broken-down glands were all over one side of the neck and upon the other side could be felt nodules not yet broken down. Would it be just to the patient, if I knew that the X-ray had a gland-contracting power, to simply

dismiss that patient after treating that one gland by one man's method? Therefore, when the gland has been treated with the zinc cataphoresis, I afterwards use the X-ray for the glands that are not broken down.

Dr. Pitcher says he uses other means of treatment; the same remarks apply to his statements. So long as the physician treats the patient first, his disease secondly, the object of my paper is accomplished.

Dr. Am Ende treats chorea and thinks it due to hyperemia and uses nitroglycerine. I will not put him to the task of stating what he expects to do with the nitroglycerine. He says that nitroglycerine causes congestion of the brain. If we can send a drug to one part of the body and cause no bad effects in another part of the body, I will be the first to use the drug.

Dr. Brinkmann was the only one who seems to have struck the keynote of the paper. He grasped the idea that the paper was intended to take the matter out of the hands of empiricists and cause the physicians to think why they use a certain method. If they remember their pathology and know what change the application of a certain modality will produce they will employ electro-therapy intelligently; otherwise they may use it erroneously.

Dr. Heuel was perfectly right in stating that in treating tubercular glands the disease was not eradicated from the system. For that reason I use the X-ray in the treatment of the glands after using the cataphoresis. In exactly the same rate of proportion that you remove the focus of infection, will the patient for the time being recover.

Dr. Francis B. Bishop, Washington: The question is such a large one that I want to say I am sorry I did not stick to Dr. Geyser's preliminary remarks instead of to the title of the paper. He wants to know why I use the constant current in the treatment of chorea. In my remarks I think I stated that chorea was due to alteration of the nutrition of the spinal cord in the large majority of cases, and I simply use the constant current because I think it is the most rational method of modifying the activity of those cells to which the motor functions refer for their power.



STATIC ELECTRICITY AND ITS DIFFERENT MODALITIES, THE TREATMENT PAR EXCELLENCE OF SCIATICA.*

BY GABRIEL M. LANDA, M. D., CIENFUEGOS, CUBA,

The treatment of sciatica and other allied neurites by drug therapy is, in my opinion, a thing of the past.

We are all convinced of this fact and should endeavor on all occasions to popularize the new methods of treatment which are based on scientific principles.

We have all read more or less beautiful pathological descriptions by different authors on sciatica and other neuritis, but when we come to the chapter of treatment, we are, alas! disappointed, not to find a rational physiological treatment for this disease; to such an extent is this true, that the matter seems to be overlooked by the authors through want of confidence in drug therapy. Many of us until late years, and I, for certain, until a recent date have treated sciatica by quinine, salicylate of sodium, and the iodides, according as we have thought the disease to be of a malarial, rheumatoid, or arthritic origin. In pursuing this line of treatment, we have invariably failed to even obtain temporary relief for our patients. I have used Paquelin's cautery with little or no success whatsoever. The reason of this failure is quite obvious: sciatica means congestion in the milder forms, inflammation of the sciatic nerve in the chronic cases, accompanied sometimes by adhesions to the surrounding tissues, and as yet no drug has been found to act directly on these deeply-seated lesions; on the contrary, static electricity relieves congestion, starts up new circulation, gives tone to the muscles, and by these actions, edema and adhesions to the surrounding tissues disappear.

Enthusiastic when I heard Dr. Bishop's paper on this question and encouraged moreover by the teachings of Dr. Snow, I endeavored to treat several cases of sciatica, which I submit briefly before you. I must confess from the start that in all cases a complete success has crowned my efforts. I have treated five cases: three of minor importance, and two which I consider very striking ones.

*Read at the Sixteenth Annual Meeting of the American Electro-Therapeutic Association at Philadelphia, September 20, 1906.

One of them, S. G., was referred to me by Dr. Alcalde, Chief Surgeon of the Civil Hospital of Cienfuegos. This patient had the first symptoms of the disease in Porto Rico and in coming to Cienfuegos entered the Civil Hospital. When he came to my office, he was unable to walk, except with crutches, he had muscular contraction of his right thigh and leg accompanied by pain, had atrophy of the muscles and all the tract of the sciatic nerve was painful. I commenced by placing an electrode over the sacro-sciatic notch, using the Morton wave-current, which I increased gradually in strength, and ended the treatment by giving the patient sparks which were gradually increased.

In the first applications I could observe that he was getting better, and in a week's time he could leave his crutches and walk with a cane quite comfortably. In two months' time he was well and had gained full strength in his limb.

The other case sent to me by Dr. Ordetx came to my office, walking with a cane and having his limb in a great contraction. He had been suffering for five months and nothing could relieve him. At first sight, anybody might have taken him for a case of hip-joint disease, but on close examination we found he had the sensitive points and other symptoms of sciatica and began at once the treatment by the wave-current and sparks. Ten applications were sufficient to have this man completely well. As I work on the seacoast in the southern part of Cuba, I have to vary the treatments, according to the season of the year.

In winter the atmosphere is very dry and I use the Morton wave-current and the indirect sparks. In summer, during the rainy season, the atmosphere is very damp and I use the static induced current and the direct spark.

In bringing these cases before you, I am aware that I have said nothing new, but simply wanted to corroborate the assertion of others and to add one grain of sand to the foundation of the work of electro-therapeutics, which consists in the relief of suffering humanity. At the same time, I deem it our duty for the sake of mankind to popularize new methods of treatment based on the most strictly scientific principles.

A PLEA FOR CONSERVATISM IN ELECTROTHERAPEUTICS, WITH REMARKS ON DOSAGE.*

(Concluded from page 564.)

BY A. D. ROCKWELL, A. M., M. D., NEW YORK,

Neurologist and Electro-therapist to the Flushing Hospital, etc.

The question of dosage is an important one and especially so in its relation to the galvanic current, first because of its chemical or electrolytic power and its profound influence upon the central nervous system and again because it is the only manifestation of electricity that is physiologically exact and whose slightest variation can be measured with absolute accuracy and satisfaction. In the use of the galvanic current for the relief of deep-seated neuritis, as in sciatica; for the pain due to parenchymatous degeneration and internal cancer, and especially for the relief of that ordinarily intractable disease exophthalmic goiter, we must have massive doses. On the theory of hyperthyroidism as the causative factor in this condition surgery steps in to limit this excess of secretion by partial resection of the gland, or the ligation of the nutrient arteries, while medicine attempts a neutralization of the toxins by an anti-toxin. Much as has been accomplished by surgery in certain cases, and valuable as may be the antitoxin treatment, I am constrained to say from a very large experience in the treatment of Basedow's disease, that with the galvanic current the results are quite good, if not better than those offered by surgery or antitoxin. Its disadvantage is that it is slow in its action, although there are some notable exceptions.

On the other hand, there is no danger and the antitoxin method might be profitably used in connection with the electrical. But the dose must be massive. There is no use for suggestion here.

The idea that two or three milliamperes can be of any real essential service is based upon faulty observation, inadequate experience and an imperfect appreciation of the physics of electricity. The question arises—what constitutes a massive dose? My answer would be, barring its surgical uses where an anes-

* Read before the Annual Meeting of American Electro-therapeutic Association, September 18, 1906.

thetic is demanded, a massive dose of the galvanic current is where it is carried up to, but not beyond the point of endurance but without injury to the skin. An analogous condition confronts us in the use of the X-ray when deep penetration is desired without injury to the skin. This is best accomplished as is now agreed by using tubes of high capacity and great penetrating power, rather than tubes of low capacity where the effect is expended upon the skin. This is but an imperfect parallel, the size and quality of the electrode combined with the current strength determining the penetration and localization of the current, as the vacuum of the tube and the force actuating it, determines the efficiency of the rays.

Bearing in mind the law, that the greater the area the less the resistance, it follows that in order to get the best effects in deep-seated pathological conditions the area covered by the electrodes should be as great as the nature of the parts permit. The nature of the electrode is also of importance, and in sculptor's clay of the proper consistency we have an ideal electrode for the purpose of giving the maximum effect with the minimum of injury to the skin. Unfortunately, however, it is mussy and difficult to handle ordinarily. To overcome in some measure the objections, I have devised and used for years with the greatest satisfaction a circular electrode.

It consists of rimmed discs of hard rubber of any diameter desired, the bottom being covered with blocked tin which is practically unoxidizable.

Filled to the brim with the clay properly prepared it is ready for use. The fact to be borne in mind then for the utilization of an efficient technique is, that the human body is hidebound, so to speak, and the important question is, how to overcome the great resistance of the skin without injury, so as to affect the deeper structures.

No fact of science is better established than that the direct physical and physiological effects of therapeutic doses of what are commonly called the dynamic forms of electricity, are concentrated mainly at the points of the recomposition of the current.

Truly it passes through the body, but its lines of force converge so instantly and have such slight density when mild currents are used, that the strength of a few milliamperes becomes practically expended before reaching any depth.

That the effect of the current is inversely proportional to the number of square centimeter surface of the electrode and directly proportional to the number of milliamperes of current is self-evident, but it is idle to say, as has been said, that the current density should be under one milliampere per square centimeter.

To get in deep-seated pathological conditions the necessary trophic sedative and circulatory effects, the current strength must often be much greater than this. Individuals, of course, greatly vary in their sensitiveness, and if they are unable or unwilling to bear the necessary discomfort, it will be often impossible to get the desired result.

The Sydenham,

Fifty-eighth Street and Madison Avenue.

Discussion.

Dr. Francis B. Bishop, Washington, D. C.: I always feel benefited when I hear Dr. Rockwell read a paper. I have been watching the tendency to discard the constant current on the part of electro-therapeutists, and have felt very sorry on account of it, because we have in it a modality that we get from no other source of electricity. The dosage, as he says, must be varied according to the conditions in which it is used. In Basedow's disease he rightly says that the dosage should be massive. The reasons for this as I understand the question, are that in this condition we have a tumultuous action of the heart—probably due to over-stimulation by pressure of the cervical sympathetic. So by stimulating the pneumogastric nerve with the continuous current, we can very greatly calm the action of the heart, by counteracting the sympathetic influence; in other words, we cause the pneumogastric nerve to produce an inhibitory action upon the heart; which inhibition is liberated by the stimulation of the sympathetic nerves. Furthermore, we get indirectly, or directly, the electrolytic effect upon the goiter. According to the susceptibility of the patient, of course, the dosage must vary. I have seen a case of Basedow's disease that would be very markedly affected by 15 ma. I have seen other cases benefited by 75 ma. If we have the courage to turn the current on gradually we will usually find the heart calmed down under the treatment, and see our patients gradually improve. I, therefore, agree with Dr. Rockwell in all that he has said in his paper, and I think his paper is one that is very timely.

Dr. Morris Weil Brinkmann: In the opening remarks of Dr. Rockwell's paper he made a statement with which I heartily agree, I wish that every paper read before this Association

would impress continuously the fact that a knowledge of electro-physics and electro-physiology should cover every application of therapeutic procedure. I agree that all the members of this Association pursue this subject with that same idea in mind. A spirit of judicial fairness has not seemed to me to be always present on account of the enthusiasm of some of the men. It may be possible that the junior members of the profession by criticising every procedure have been led into error.

The doctor has spoken of a definite area of electrode with a particular density of current per square cm. I should consider the instructions which he gave were certainly not in the direction of conservatism; quite in the opposite direction. I have taught that when possible, the density of current should not exceed 1-4 ma. per square inch of surface. In the tissues of the neck we have very sensitive skin and when we wish to strengthen the current not alone that question arises, but another serious question, in that when the continuous current is applied across the neck we get this effect upon the pneumogastric. We have giddiness, nausea, and vomiting. The variations are marked because idiosyncrasy plays a rôle, however within moderate limits only. More than that I do not think we can give, except with certain precautions as to the direction of the current. If we give our current in such a way that the posterior electrode is in the anterior triangle of the neck and the anterior electrode on the thyroid we have this influence upon the pneumogastric.

The doctor spoke of the stimulating and the irritating quality of the constant current. Its stimulating effect resides in its irritable quality and the irritation of the perceptive apparatus in the nervous system is simply a question of degree, the stimulant simply being a milder form and acts in connection with the dosage.

I think the preliminary remarks in the doctor's paper are exceedingly valuable and they should be adhered to by the writer of every paper. When we have a body of men employing currents with an accurate knowledge of the nature of the current and of the condition of the individual, these errors in technic can hardly occur.

Dr. G. Betton Massey: The imperfect apparatus that we have might, I think, be regarded as a cause of the lessened employment of the constant current modality mentioned by Dr. Rockwell. What would be thought of a drug store that did not have accurate scales? If we placed all the meters downstairs in the Exhibition in a row and passed a current through them, without doubt all would be wrong, and no two would be alike. These currents must also be turned on gradually to give the action desired; without perfect controllers and meters this cannot be secured. The seriousness of this question was illustrated recently in the Oncologic Hospital where, in an attempt to secure per-

fect meters, a number were installed, and it was found that all except those made by one firm gave wrong readings.

The rubber cup electrode referred to by Dr. Rockwell commends itself somewhat to me. Kaolin, which is sometimes used instead of potter's clay, can be bought of chemical brokers and is perfectly white and non-staining. Instead of such a cup, I prefer personally to have the material kept permanently inclosed in crash-toweling pads of various sizes, immersed, when not in use, in warm water in a copper sterilizer.

Dr. A. C. Geyser: It is always gratifying to listen to a paper by Dr. Rockwell, especially when he speaks upon conservatism. There is nothing that I admire more than conservatism, unless the conservatism should lead anyone so far from the path that there is little or nothing left. Dr. Rockwell is very right in insisting upon proper dosage and we understand him to be an advocate of Ohm's law, but Ohm's law has always been a very peculiar thing to me. It is very fine for mechanical engineers particularly to apply to, but when it is applied to the human body, I do not think there are any two persons in the room who would make up an element of equation of Ohm's law. To me it has never appealed very strongly in the application of currents to the human body. The doctor is very apt, in my opinion, to be a little bit ultra-conservative, and a number of papers have this tendency. It is almost as bad to lean to enthusiasm as it is to lean to ultra-conservatism, for there are a number of men in our profession starting out in electro-therapeutics, and when a man like Dr. Rockwell speaks, his words are well considered. Inexperienced men are apt to think that they must be absolute scientists before they can use electricity. I hardly think that that sort of an opinion ought to be created. I like rather the happy medium in having the pendulum swing neither too far to the left nor the right. I think the chances are that the man who reasons, even if he does not adhere to ultra-conservatism, will sooner or later gain results.

The doctor also spoke of the constitutional effects frequently overshadowing the local. That is really to be expected, because the whole range of electro-therapy could be summed up in the one word, vibration. One rate will produce one effect; another rate, another effect. The tendency to get away from galvanism is not so much due to improper apparatus, for a slight variation in meters would not make a great difference; whether a person gets 5 ma., 6 or 8, makes little difference. All we want is the vibratory effects in the body. These we get in the other methods so easily that we are in the habit of getting away from the faradic current.

Dr. Emil Heuel, New York: Unfortunately, I did not hear Dr. Rockwell's paper, but, if it is not out of order, I would like him to say for our benefit what electricity is; whether it

is a solid or a fluid; how transmitted along the wire, on the outside or the inside of a wire.

Dr. Rockwell (closes): In the use of food we do not as a rule care to urge people to eat; they will eat all they want to if they have the appetite of the palate, and more than they want, and then the result is disease. So, in the use of any physical agent, of any method of treatment; we don't want to urge people to tell all the good things that it does, they will do that; but, we do urge them to determine just exactly what it will do, and tell the evil, or where it fails to succeed. That is what we mean by conservatism. We must preserve our self-poise in the matter.

I do not agree with Dr. Brinkmann in the matter of judicial fairness in the development of electro-therapeutics. If he keeps in touch with all the literature he will see that people are writing in the most unreasonable and extravagant way all over the country.

I agree with Dr. Brinkmann on the matter of dosage, that we must be very careful when application is made to certain sensitive places such as the neck when the pneumogastric is to be influenced; I mean that massive doses should be given in the proper place, not when they will affect the functions of life.

General faradization I have used for thirty years, and after having used every modality in the domain of electro-therapeutics I still feel that I could not do without it. I think we should not decide against it theoretically but that we should base our judgment upon our practical experience. With many patients (and I am speaking to the younger men) you will find that it does more good than any other form. Of course, you will find that some are benefited more by one method of treatment, and some by another; and so it is in the matter of dosage.

One gentleman spoke of the dosage in exophthalmic goiter. Fifteen years ago I wrote a paper in which I gave statistics of forty-five cases of goiter and since then I have had many more. I think if the sensation of the patient is carefully gauged and the dose properly developed, that almost any patient will bear from 30 to 60 ma. I am confident that we cannot expect the best results in the use of the galvanic current in exophthalmic goiter under the maximum dose, the dose that you can give the patient without damage to the skin. The question asked by the last speaker could not, of course, be considered for a moment, for it could not be answered. The question was asked me by no less a person than President Roosevelt when a little boy of twelve, "What is the nature of electricity?" I was unable to answer it then, and I cannot answer it now.

Editorial.

THE EMPLOYMENT OF PHYSICAL AGENTS BY GENERAL PRACTITIONERS.

AS the practical side of therapeutics develops, it becomes more and more patent to the observing physician who employs the so-called physical measures that the future success of the profession lies largely in their general adoption, not only for the relief of chronic conditions, but for every-day employment in the lesser ailments as well as in acute infectious diseases.

Chemistry in the hands of the profession has proved too often a failure and with advancing years the earnest, honest practitioner becomes less and less reconciled to the general employment of the drugs of the pharmacopeia. In truth the tendency of the times with the leading teachers in the profession is towards the abandonment of universal medication.

The present tendency for the treatment of infectious conditions is the institution and development of antitoxins, in the use of which there is great danger of going too far. The introduction of one poison into the system for the purpose of overcoming another poison, is heroic and questionable except when heroics are indicated. From the rational point of view such measures are fraught with great danger to the patient. The indications are better met by increasing the opsonic resistance of the organism, thereby destroying the infection of the system by the body's own internal fortifications. In the physical agents there is abundant proof at this time, that we possess *certain* means of overcoming most of these conditions. In light, high temperature, cold, and various electrical and other mechanical modalities, we have potent means for increasing the activities of the physical functions and the removal of the effete products of tissue combustion, as well as the destruc-

tion and elimination often of organisms that prey upon the living cells.

The first indication in all diseased conditions whether local or constitutional is the induction of physical activity. The human body is constituted to require a large degree of general activity for the maintenance of health. The disposition of human nature is against this requisite of health, for the human being is lazy, and if health is to be preserved without exercise, some external means of inducing activity not normally induced by exercise, must be instituted; for besides being lazy, the human being is apt to be a glutton. *Inactivity* and *gluttony* are the most common causes of ill health, owing to the production of systemic stagnation. It is as rational to throw chemicals into a stagnant pool with the view of draining it, as to put them down the neck of a lazy gormandizer with a view of curing him. The bowels may be evacuated, but little more. What is required in the treatment of that individual is the induction of physical activities by energetic means which act upon the emunctories by forcing the activities of the body, and not by depressing the whole system as is too often done by poisonous agents. With these it may be possible to afford temporary relief; but to cure by such means is impossible. Regulated exercise, light baths, high-potential electricity, the administrations of heat, and mechanical vibration—agents that induce active metabolism—one or more of them as indicated, with a regulated diet will institute a healthy régime, and without their employment complete restoration is impossible.

For relief of chronic inflammatory conditions the physical measures, particularly the static currents, mechanical vibration, and light are generally imperative, and in acute inflammatory conditions they are the greatest boon to suffering humanity, because they relieve stasis early, institute prompt repair, and otherwise destroy the germ processes as well, either by raising the opsonic index or destroying the offenders *in situ*. So general is the requirement for these modalities in therapeutics

that the day is near when the general practitioner must employ them or his patients must unnecessarily suffer or go elsewhere for treatment.

* * *

MEASUREMENT OF X-RAY DOSAGE.

NUMEROUS types of apparatus for measurement of therapeutic dosage of the Roentgen ray have been presented for the consideration of the profession with convincing arguments from the point of view of the inventors, but at the present time none of the devices can be counted as reliable. The chromometer of Benoist, which indicates the different degrees of penetration of the rays under varying conditions of intensity and volume, is the most practical of the present means of measurement.

There are two important factors to be taken into consideration in connection with the determination of X-ray dosage which take note of the characteristics of individual rays and the volume or number of rays. (1) It is a well-recognized fact that the X-rays projected from a high vacuum tube have an intensity relative to the greater degree of potential required to overcome the resistance of the tube, and characteristically a greater capacity for penetration. (2) An equal number of rays from a low vacuum tube have always a degree of penetration relative to the vacuum. If, however, a current of larger amperage is passed through a tube of low vacuum, the great number of rays produced from the passage to the anti-cathode of millions of negative electrons induces a larger degree of penetration and length of projection, which may equal or exceed the penetration of the smaller number of rays having the characteristic penetrating qualities of rays from the high vacuum tube. By this it will be readily understood that a larger number of these rays from a low vacuum tube are required to produce the same degree of penetration as indicated by a chromometer than a smaller number from a high vacuum tube. When the showing is relatively the same in point of penetration; for therapeutic purposes the large volume of rays would be far more active upon the tissues, than the smaller number of radiations from the high vacuum tube. The chromometer

therefore, would not be a correct index of the therapeutic action of the rays upon the tissues.

Probably no better index can be discovered than the relative fluorescence upon the glass walls of the tube indicated by the varying tints of green. It is a well-known fact, however, that the appearance of this fluorescence varies with the quality of the glass employed and also slightly with the age of the tube. Slight differences in the thickness of the glass wall is the only objection. The relative fluorescence, however, with different degrees of radiations in a given tube is for practical purposes reliable. The operator who is daily engaged with his X-ray tube in the use of the X-ray, becomes familiar with the quality of fluorescence, of the relative intensity and volume of radiation, and the personal equation becomes the main factor for judgment in X-ray dosage, and is far more reliable than the various chemical changes which take place in substances designed for measuring X-ray dosage. Systemic regulations of periodicity, time, distance, and fluorescence are the best guides for therapeutic dosage. An eight to ten revolving plate static machine having plates thirty inches in diameter revolving not more than three hundred times per minute is practically safe and efficient in most cases in which the physiological limit of toleration is sought, administered on alternate days with a space of ten inches between the anti-cathode and the surface of the body,—exposures to be of ten minutes' duration when the tube backs a parallel spark of one-half inch or more. A tube of lower vacuum to be placed nearer the patient.

Under the recognized method of applying graded doses of proper volume and intensity the indication to discontinue the exposures will be the relief of the condition under the treatment or a commencing slight dermatitis—the danger signal.

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DEPARTMENT OF QUERIES.

A DEPARTMENT was established in the JOURNAL devoted to Queries and Answers, four years ago, but as there was no response to the department it was abandoned. As it has been requested we will again open this department, beginning with the January number, and trust that it will be favorably received.

Progress in Physical Therapeutics.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

The Value of X-rays in Ocular Therapeutics. By G. Oram Ring, M. D., in Jour. A. M. A., September 29, 1906.

He considers the therapeutic effect of the X-rays from the standpoint of Freund, as to the agents we have to deal with from an X-ray tube in action: (1) heat, (2) ozone, (3) cathode rays, (4) ultra-violet rays, (5) rays composed of material particles, (6) Roentgen rays, (7) spark and brush-discharges from the high-tension electrical accumulation on the surface of the tube, (8) electric and electro-dynamic wave, (9) waves of unknown character. He considers the unknown rays, the X-rays, and the electrical discharges on the surface of the tube the main ones to be considered. He considers the effect of the X-rays as stimulating the vaso-constrictor nerves of the blood vessels. Paralysis of these nerve filaments, accompanied by vascular dilatation edema, resulting from paralysis when carried to a high degree, which may result in the destruction of the tissues.

His own results have been uniformly successful in epitheliomas of the eyelids and the adjacent structures, and he believes it his duty to leave very little doubt in the minds of his patients as to the success of the treatment. In only one case has he found any tendency to recurrence, and a very few treatments then controlled it; after which it remained in perfect condition. He quotes Mayou and Walsh of London, who have claimed heretofore, that in all cases rodent ulcer of the eyelids can be cured by this method. The dermatitis from X-rays varies from a slight leucocytosis to absolute destruction of the tissue. He thinks that the effects are largely superficial and that in leucocytosis the irritating substances are removed, encapsulated or rendered innocuous. He reports Pusey as having treated several cases of epithelioma in which the involvement was not deep, all of which were successfully treated. No relapses occurred and many are of over three years' standing. He reports Green of St. Louis as considering the X-rays as surpassing all other treatments for rodent ulcer and epithelioma of the eyelids. He reports Sweet as no longer believing in plastic operations in these cases, as he has a record of recovery of eighteen out of twenty cases treated. He reports a case of epibulbar epithelioma by Weeks: man aged fifty-four, had a growth occupying the inner half of the ocular conjunctiva to the caruncle which involved about the inner third of the cornea, microscope confirmed diagnosis. About one hundred X-ray exposures were given over a period of eight or nine months of

an average of seven minutes each, ten inch distance, Gundelach tube of medium tension used. Patient virtually well, vision 20-40. Tissues of the globe did not suffer. De Schweinitz had four cases of entire and rapid cicatrization with no relapse. Two other cases were negative and he considers when X-rays fail, a plastic operation should be performed. Charles Lester Leonard, whose experience has been extensive, regarded it as uniformly and permanently successful. Baker has had five cases of rodent ulcer with perfect recovery. Two of the cases were exceedingly severe, which makes them especially interesting, also two cases of lupus of the eyelids, which greatly improved under the ray. Newcomet advised that he has treated about thirty cases, few of which have shown any tendency to recur. Schamberg's case involved not only the lids but the conjunctiva as well. Perfect cure resulted. "Deep carcinoma in the orbit"—Dr. Wilder's patient treated by Dr. Pusey. The growth involved all the structures in and around the orbit, and the terrific intracranial pain seemed to leave little doubt of meningeal involvement. After nearly two months of treatment and a resulting X-ray burn with increasing pain, the case was regarded as hopeless and discharged. Six months later they found that he was still living. The mass had shrunk, the lids would close, he was free from pain, could eat and sleep well.

Of ten cases reported by Bull, two were extensive carcinomata. One was a case of the eyeball and orbit in which operation was advised and declined. The case was cured by twenty-seven X-ray exposures. The other was a case of deep-seated carcinoma, involving the nose, eyelids, and orbit, likewise perfectly cured by thirty-four exposures.

His deductions are, that, while in deep orbital sarcoma the results are not nearly so favorable as in the superficial forms of the disease, yet it is of inestimable value and should be used also in deep conditions. He refers to the very favorable results obtained by L. Webster Fox, Leonard, and Pfahler in cases of inoperable sarcoma. These reports are supplemented by like reports from Beclere, Kienbock, and Theobald, Mosely, Pratt, and Harper, which certainly make a good show for X-rays in sarcoma. He calls attention to the treatment of trachoma by X-rays and reports Mayou's case, who claims for it first, less deformity of the lid after treatment; second, it is practically painless; third, the pannus clears more thoroughly. He presented his first case in 1902. Instead of the white puckered conjunctiva gained by other methods, a super-non-contracted, non-scarred conjunctiva, with no obliteration of the fornices, was secured. Subsequently, perfect results were obtained in fifteen similar cases. No burning of the globe occurred in any case. Two-minutes exposures were given for from four to six successive days, followed by a week's rest,

then came semi-weekly exposures until slight photophobia began. Treatment was promptly stopped and the granules disappeared.

Stephenson and Walsh selected severe cases, which ordinarily required long treatment and all were cured in a few weeks. Vassutinsky, Ruggero Pardo, Hornica, and Romania, all report great success in the treatment of trachoma.

Cassady and Rayme report a case, who suffered for nine years from granular lids in spite of all treatment and was afterwards treated by X-rays and entirely cured.

Newcomet and Krawl exhibited a girl of eighteen, who had been subjected to all the operations for the cure of trachoma without success, which improved markedly under the X-rays. Bishop of London reports poor success in the treatment of trachoma. Kassabian, from his success obtained in the treatment of trachoma, considers it the most valuable treatment available for this disease. W. Franklin Coleman has had such success that he would consider no other method.

Allport of Chicago reports a case of vernal conjunctivitis which had resisted all methods of treatment for seven years. The growth was first amputated and eighty applications of X-rays made. The result was perfect and with no return after two summers. Like results are reported in this condition by Pusey, William Campbell Posey, Zentmeyer, and Sweet. The author reports success with nevus of the eyelids by this method.

Chronic conjunctivitis, glioma, gummata, scleritis, episcleritis, corneal ulcers, uveitis, and tuberculosis of the conjunctiva—all these conditions have been successfully treated by the X-rays.

He thinks it important that a note of warning should be sounded regarding the possibility of unlooked for results of a serious character, which are said by competent observers occasionally to follow X-rays exposures.

The Influence of X-rays in the Treatment of Leukemia and Hodgkin's Disease, with a Report of Two Cases. August H. Roth, A. B., M. D., Jour. A. M. A.

These cases of symptomatic cure are very interesting and I will quote very freely from the papers.

Patient of Dr. Dock, commenced treatment May 13, 1904, on account of nodules on the side of the neck with pain in neck and thorax.

History.—Family history negative, had measles, scarlet fever, and three attacks of grippé. First noticed mass on left side of neck five years before, mass soft and puffy, freely movable beneath the skin, was harder after six weeks, also became more painful. The skin over the mass became sore to the touch. He had noticed in the previous winter a shortness of breath and difficulty on inspiration, and had lately become hoarse,

breathing becoming more difficult at night. Other lumps had also appeared since the first described. They had appeared in the following order, (1) on the neck above the clavicle, (2) under left arm in axilla, (3) behind angle of left jaw, (4) on the chest, (5) behind angle of right jaw. The patient had fallen in weight from 160 to 139 pounds, had no appetite, and was habitually constipated, but had no cough.

Examination.—Frame of moderate size, panniculus fair, muscles flabby, skin sallow, slight edema of ankles present, and had enlarged superficial glands extending to the mammary glands.

The cervical lymph glands were enlarged on the right side. They were as large as a lima bean and some of them were adherent to one another. The right maxillary gland was negative, while the left was the size of a robin's egg and firm but movable. At the outer end of the left clavicle was a nodular mass movable under the skin, hard over the larger nodules, but not tender on palpation. The left axillary glands were enlarged, one being the size of a lima bean. The right axilla was negative, the inguinal glands were negative.

Right percussory.—There was a marked relative dullness above the left clavicle caused by the mass described above. A diminished resonance below the clavicle to the second rib. A prominence of 1-8 to 1-4 inch above the surface on the upper part of the sternum, rounded slightly more on the left side. Relative dullness extended more over this area. There was a slight area of resonance over this side and heart dullness. The percussion over the front and sides was otherwise negative. There was good vesicular breathing over the front and sides. Over the dull area the inspiration and expiration were rather hard. Percussion of the back was negative.

Heart, negative; the spleen and liver were not palpable. Abdomen and urine were negative.

Red blood counts—red varied from 4,400,000 to 3,600,000; whites from 7639 to 2500; hemoglobin from 80 to 90 per cent.

Treatment.—The patient was treated with the X-rays every other day over the enlarged glands from May the 6th until June the 10th, when the swelling above the clavicle had diminished in size. Only two or three glands were apparent, the largest of these being as large as a small almond. The swelling below the left ear had disappeared. There was slight redness on the prominence of the sternum, and the tissues felt thickened. The area of relative dullness was smaller, the glands of the left axilla could no longer be felt, and the patient left the hospital. July 13, she returned with a recurrence. The X-rays were given every day and arsenic was also administered. The patient was discharged in October, when the glands had returned to their normal size. On January 1st she returned with another recurrence, was dismissed again on

February 5, again apparently well. On May 18 the patient again returned with slight recurrence, and was treated daily until July, 1906, when she was again dismissed with the glands absolutely normal.

On examination of glands, one of which was removed for microscopic examination, it was found to be a Hodgkin's gland (lymphadenoma) of the D. M. Reed type. A detailed description is given by Dr. Butterfield of the Pathologic Department.

This case is especially interesting owing to the enlarged lymph glands in the upper mediastinum, causing difficulty in breathing and swallowing, due to pressure exerted on the bronchi and esophagus. The X-rays relieved the symptoms entirely by decreasing the size of the glands. This patient at the present time seems to be absolutely normal, but it is very likely she will have to again resort to the X-ray treatment for recurrences, although she is now symptomatically cured.

Spleno-Myelogenous Leukemia—Report of Case under X-ray Treatment with certain Blood and Urine Findings.—Patient came to the hospital on March 3, 1905, because of a dull, heavy feeling in the pit of the stomach with belching of gas, and swelling of the feet and ankles.

Present illness.—For three years the patient has had pain in the pit of the stomach with belching of gas. Pain has increased the last year. The patient has lost twenty-five pounds. Most symptoms were negative, ankles were swollen, and moderate pulsation in both jugular veins from the clavicle to the ears.

The thorax and heart were negative, and abdomen on level with the ribs. There was a slight dullness in the left epigastric region. A splenic enlargement had made a tumor that filled the whole left side of the abdomen.

The blood count showed red corpuscles 2,500,000; whites, 135,000; hemoglobin, 70 per cent.

The diagnosis was spleno-myelogenous leukemia.

Treatment.—X-ray treatment was begun March 20, 1905. At first the spleen alone and later the long bones were treated. A hard tube was used at a distance of ten inches and exposures varied from seven to fifteen minutes. In all the patient took about 2800 minutes. The blood condition was rapidly becoming worse when the treatment was started and it was about three months before any improvement was noted; and the leucocyte count for the first year did not fall below 100,000, when it diminished rapidly to 57,320 in one month. The patient was given arsenic as an adjunct to X-ray treatment. The leucocytes at the present time are reduced to 4680.

Urinary findings.—The earthy phosphates were found to be diminished as the treatment continued. Traces of albumen in the beginning of the treatment soon disappeared, as did also the granular casts.

Summary.—(1) The beneficial therapeutics and value of the X-ray treatment in Hodgkin's disease is well demonstrated in the cases reported. The decrease in glandular enlargement was comparatively rapid, but the enlargement will probably recur unless X-ray treatment is persisted in.

(2) In the case of leukemia, it took considerable time for the X-ray to inhibit the progress of the disease, as is indicated in the great increase in the leucocytes. After persisting in the X-ray treatment for over a year the leucocyte count finally returned to normal. The splenic enlargement was not much decreased.

(3) The immediate effect of the X-ray treatment is to increase the number of leucocytes in the general circulation. This increase is accompanied by a large increase of the number of degenerate cells, most of which are disintegrating myelocytes. Although the leucocyte count had remained normal for two months, the patient was advised to continue the use of the X-ray at intervals to prevent the recurrence of the disease.

PSYCHO-THERAPY.

EDITED BY LESLIE MEACHAM, M. D.

Dr. A. T. Schofield of London read a paper upon the subject of Mind in Medicine at the recent meeting of the British Medical Association, held in Toronto. He suggested the following points for study and lectures in the ordinary medical or post-graduate courses:

1. General study of the interdependence of mind and body; first of all in health, thus taking up the great question how, as a whole, the body lives; and then in all manner of disease; with a general enumeration and consideration of the various psychic agencies that may act as causes of disease—predisposing or exciting—and another list of the various ways in which the mind may act therapeutically.

2. Study of temperament and mental states, and their relation to disease, compatible with sanity and yet of a pathological aspect; such would include various nervous states and phases, and mental backgrounds and habits of thought,—fixed, mobile, and erratic.

3. The bearing of character, education, social status, and environments on the cause and cure of disease, and especially in the power to aid or retard the action of psycho-therapeutics.

4. The psychology of drugs, natural remedies, and the whole range of therapeutics. This is a little-known subject, and will repay a study which shows to what an unsuspected extent many well-known natural remedies owe their efficacy to their psychic rather than their physical qualities.

5. The study of the *vis medicatrix naturæ* in all its powers and aspects, and in what ways the physician may aid or retard its operations.

6. Scientific study of all forms of psycho-therapeutics—direct or indirect—and of all forms of suggestion and auto-suggestion.

7. Lastly, I would suggest a careful study of the psychology of the physician, and the psychic effect of his personality, his character, his words, and his environment. For this we may take as our text Sir James Paget's well-known words: "Nothing appears more certain than that the personal character, the very nature, the will of each student, has a far greater force in determining the career than any other help or hindrance whatever."—St. Louis Medical Review.

STATIC ELECTRICITY.

EDITED BY J. H. BURCH, M. D.

The Treatment of Rheumatoid Arthritis and Allied Conditions of the Joints.

In a communication presented before the Section on Orthopedic Surgery, New York Academy of Medicine, April 20, 1906, and published in the September issue of the New York State Journal of Medicine, Dr. William Benham Snow reviews in his usual masterly manner, the etiology, pathology, and still more important, his valuable treatment of rheumatoid arthritis and allied conditions of the joints.

Dr. Snow affirms, that in the treatment of rheumatoid arthritis there are always four things to consider: (1) the cause; (2) the central condition; (3) the general constitutional condition, and (4) the local affection.

In an experience with more than sixty cases of this disease, Dr. Snow has found invariably that some exhausting condition or circumstance has been present prior to or associated with the onset of the affection. Chronic nephritis, marasmus, grippe, affections of the alimentary canal, pelvic derangements, overwork, anemia from various causes, auto-intoxication from constipation, each play an important part. These seem to bring about nutritional changes in the trophic centers of the cord, for the conditions present are characteristic of those associated with involvement of the cord.

Dr. Snow regards the prognosis of this affection, that has hitherto been considered uniformly bad, very encouraging, in the light of our present therapeutic progress.

All cases except those in the last stage can be brought to a *status quo*, and kept from progressing by energetic treatment. Within the first two years—the first stage—there are very few cases that cannot be entirely abated and the condition rendered approximately normal.

In the second stage, which Dr. Snow designates as the stage of degeneration or destruction, the degree of improvement will depend upon the extent of structural changes and the method

and regularity of treatment. In this stage the whole process can in most cases be abated and pain and suffering gradually relieved.

Dr. Snow regards auto-infection as an important factor in the prognosis of this affection and advises that acute intestinal catarrh with fermentation should be carefully attended to.

In considering the treatment of rheumatoid arthritis, Dr. Snow states, that this affection requires more time, patience, and careful attention to technique than all other joint conditions. He directs his treatment to the restoration of general health, removal of the exciting cause and the relief of the local conditions. A most careful and painstaking examination should be made in each case to determine the cause, which should be corrected. Strict attention to diet and the building up of the economy are matters of first importance. The diet in the main should be generous, made up of the most nutritious and digestible foods.

Dr. Snow affirms, that the conditions of poor metabolism characteristic of this disease are remarkably benefited by the employment of physical agents, static electricity, light, and mechanical vibration.

Dr. Snow especially emphasizes the value of the energizing effects of the static wave-current in atonic conditions. It is his rule to employ this modality at least once daily over the spine or abdominal viscera. When the nutritive processes are, however, in good condition its administration over a large joint will be all that is required.

Dr. Snow also recommends the administration of concentrated light from a high-power incandescent lamp or marine search-light, or an incandescent-light bath serves a valuable purpose in inducing a restoration of the functions of the skin and otherwise stimulating an active general metabolism.

Mechanical vibration is also advised by Dr. Snow from both the view point of spinal stimulation and vibro-massage. He considers it a valuable adjunct to static treatment both general and local. It serves to stimulate active general and local nutrition, applied over the spine, or inhibits when used according to the indications, and locally as a method of vibro-massage it is by far more effective and less laborious than manual massage. Locally it is invaluable in relieving tension and muscular contraction.

In the treatment of the local condition proper Dr. Snow advises against the ordinary treatment by means of rest and fixation. He affirms that rest favors rather than relieves local stasis. The cardinal principle of his treatment is the relief of stasis, functional inactivity, or stagnation. To accomplish this object Dr. Snow advises the employment of the static wave-current, the static spray, and especially the long or short static spark. Light and mechanical vibration he also considers of great value. By the persistent employment of the static spark,

stasis and local congestion are relieved, as is also the sense of heaviness and painful stiffness about the joint.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

Water Drinking and Polyuria in Typhoid.

Cushing and Clarke (American Journal of Medical Sciences) report on the results they obtained in prescribing large quantities of water to typhoid patients. It was soon found that without discomfort or special reluctance on the part of most patients, the unexpected and unusual amounts of a gallon and a half or even more could be taken in twenty-four hours, providing the water was administered in small quantities,—four ounces at definite and frequent intervals, every fifteen minutes during waking hours. In addition to this, the ordinary patient received, every two hours during the day and once or twice at night, alternately, six ounces of milk and six ounces of albumin water. The resulting diuresis was marked, the degree of polyuria, day by day, closely corresponding to the quantity of fluid ingested. Furthermore, the total nursing care of these patients was less than of those not so treated, and their general comfort seemed apparent. Headaches were not so troublesome; tongues and mouths kept noticeably clean and moist; apathy, deafness, restlessness, nocturnal delirium, and other nervous and toxemic symptoms seemed less in evidence; hypnotics were not so often needed; nausea was unusual, and remission from fever appeared more frequent. Complications were few, and there were no deaths among fifty-six cases so treated, although the prevailing epidemic was of severe type, and the general mortality, on the whole, was large.

Typhoid Fever.

Thomson, in an article in Med. News (abstracted in The Journal, April 8, p. 1147), on typhoid fever and its management, recommends early attention to the state of the kidneys by the administration of a reliable diuretic, and for this purpose he advises hot normal saline solutions per rectum twice a day. He uses four gallons of the solution at a temperature of from 115° to 120° F., with a return flow instrument.

He recommends the Brand bath at a temperature of 70° F. as the best means of promoting elimination by the kidneys. The patient should be placed in the bath when the temperature reaches 102.5° F., and allowed to remain according to its effects. If the temperature drops from one to two degrees while in the bath he should be taken out, although he has been in the bath only five minutes. It should never be allowed to drop to 100° F., as it continues to fall after he is removed from the bath. On the other hand, if the temperature should rise

instead of falling, after he has been in the bath for ten minutes, he should be allowed to remain in the bath until it begins to fall, though it may require half an hour to do so. Severe shivering should not be given any attention, and a good remedy to shorten this condition after the bath is a teaspoonful (4.00) of Hoffman's anodyne combined as follows:

R. Spts. etheris co..... 3i 4
 Aq. camphoræ..... 3i 30
 M. Sig.: At one dose immediately after removal from the bath.

Some patients cannot take cold baths on account of the pulse remaining weaker after the effects of the bath have been recovered from than before it was taken. In such cases a warm bath from 95° to 98° F. is recommended if it will reduce the temperature; if not, the cold bath must be given fearlessly. He states that he has seen more bad results from timidity in using cold baths than from their excessive use. The only non-indication for Brand's method is the occurrence of intestinal hemorrhage.

In hyperpyrexia the patient should be dealt with just as in cases of sunstroke, by keeping him in an ice bath for 15, 30, 40, or 48 minutes.

Baths for the People.

The importance of frequent bathing to the health and comfort of the people is well recognized, and the establishment of the public baths of St. Paul a few years ago has done more to contribute to the happiness and welfare of an immense number of men, women, and children than any other one thing in the history of this city. There are thousands who live in homes where there are no bathing facilities and where water even in the small quantities necessary for washing the face and hands must be carried. It is time that public bath houses for the people should be established, which will be available every day in the year, baths whose actual bathing facilities shall be free.

SOCIETY MEETINGS.

SIXTEENTH ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION,
 SEPTEMBER 18, 19, 20, 1906.

(Held at the College of Physicians of Philadelphia.)

(Continued from page 587.)

MORNING SESSION. EXECUTIVE SESSION.

REPORT OF STANDING COMMITTEES.

For the Committee on Electrodes the Chairman Dr. Francis B. Bishop of Washington reported progress. In this connec-

tion he called attention to a light condenser. The President asked that he put the report of his description of the condenser in writing or in the form of a sketch. This Dr. Bishop agreed to do and the report was accepted.

For the Committee on Cataphoresis, Dr. G. Betton Massey, Chairman, reported progress.

Upon behalf of the Committee on Current Classification and Nomenclature, Dr. Brinkmann reported that he understood, though not absolutely informed, that the bulk of previous reports was in type and would shortly become available to the members, although, as was known, it was in two sections.

SCIENTIFIC SESSION.

Dr. A. C. Geyser of New York City read a paper on *When are Electro-Therapeutics Indicated?* The paper was discussed by Drs. Francis B. Bishop, Washington, D. C.; G. Betton Massey, Philadelphia; Pitcher of Massachusetts; Charles Am Ende, New York City; M. W. Brinkmann, New York City; Emil Heuel, New York City, and closed by Dr. Geyser.

Adjourned to 2 P. M.

FIRST DAY. AFTERNOON SESSION.

The afternoon session was called to order by the President at 2.30.

Dr. A. D. Rockwell of New York City read a paper entitled *A Plea for Conservatism in Electro-Therapeutics*. The paper was discussed by Drs. Francis B. Bishop, Washington; M. W. Brinkmann, New York City; G. Betton Massey, Philadelphia; A. C. Geyser, New York City; Emil Heuel, New York City, and closed by Dr. Rockwell.

Dr. Francis B. Bishop of Washington, D. C., read a paper on *Locomotor Ataxia*. This was discussed by Drs. A. D. Rockwell, New York City; Fred H. Morse, Boston; A. C. Geyser, New York City; Morris W. Brinkmann, New York City; J. D. Gibson, Denver; Herbert F. Pitcher, Haverhill; and closed by Dr. Bishop.

Dr. George D. Bond of Hillsboro, Texas, read a paper entitled *The Uses of Static Electricity in the Treatment of Gastric Disorders*. The paper was discussed by Drs. Fred H. Morse, Boston; Sinclair Tousey, New York City; Finkelpearl, Pittsburgh; W. Benham Snow, New York City; J. H. Mudgett, Philadelphia, and closed by Dr. Bond.

A paper by Dr. Otto Juettner of Cincinnati entitled *Electricity as a Factor in the Treatment of Certain Chronic Diseases of the Stomach* was read by the Secretary and discussed by Drs. F. H. Morse, Boston; Samuel Spencer Wallian, New York City; Herbert F. Pitcher, Haverhill; J. O. Bryant, Chester; A. C. Geyser, New York City; F. Barrett, Westbrook, Me.; J. D. Gibson, Denver; J. H. Mudgett, Phila.; W.

Benham Snow, New York City; Henry Finkelpearl, Pittsburg; Frederick Strong, Boston; Charles A. Donaldson.
Adjourned to 8.30 P. M.

FIRST DAY. EVENING SESSION.

The meeting was called to order at 8.30 by the President.

Dr. Henry W. Frauenthal of New York City read a paper entitled *Electricity in Joint Affections*. The paper was discussed by Drs. G. Betton Massey, Philadelphia; Edward Titus, New York City; Thomas W. Brockbank, Philadelphia; George C. Johnston, Pittsburg; John H. Burch, Baldwinsville, N. Y.; Fred De Kraft, New York City; Sinclair Tousey, New York City; J. D. Gibson, Denver; George C. Goodell, Salem; and closed by Dr. Frauenthal.

Dr. Thomas W. Brockbank of Philadelphia presented a paper entitled *Treatment of Lumbago and Other Painful Conditions of the Muscles of the Back*. The paper was discussed by Drs. Henry W. Frauenthal, New York City; Herbert F. Pitcher, Haverhill; F. Barrett, Westbrook, Me.; George D. Bond, Texas; W. Benham Snow, New York; Sinclair Tousey, New York; J. D. Gibson, Denver, and closed by Dr. Brockbank.

Adjourned to 9 A. M., Wednesday, September 19.

SECOND DAY. WEDNESDAY, SEPTEMBER 19. MORNING SESSION.

The meeting was called to order in Executive Session at 10 A. M. by the President.

Upon motion, the reading of the Minutes was dispensed with.

Proposals for membership of Dr. Rupert, Dr. Charles A. Donaldson, and Dr. John H. Mudgett were read and upon motion the Secretary was directed to cast the ballot for their election.

Drs. De Kraft, Pitcher, Barshinger, Brenemann, Wallian, and Heuel were nominated candidates for the Nominating Committee. Drs. Titus and Brinkmann were appointed Tellers.

As a result of the votes cast for candidates of the Nominating Committee, Drs. Heuel, Pitcher, and Brenemann were declared elected.

Dr. J. D. Gibson and Dr. William T. Bishop were appointed on the Auditing Committee.

The Report of the Secretary was then read, and upon motion it was accepted and referred to the proper Committee.

Treasurer's Report. The Secretary stated that there was no direct Treasurer's Report, but that the books were at hand; that the Treasurer was not able to be present and had sent a letter of regret. The letter was read by the Secretary.

Under Miscellaneous Business the Secretary read a letter from Dr. F. W. Marks, inclosing a contribution to the Society and expressing his appreciation of the kind hospitality he had received at the last meeting of the Association.

Upon motion of Dr. Brinkmann the Secretary was requested to make a proper response to Dr. Marks.

Dr. William W. Eaton of Danvers spoke of the establishment of a local society at Boston consequent to the Resolution that the Association approve of the formation of local societies, which resolution had been offered by Dr. Eaton at the last annual meeting.

Dr. Frauenthal moved that hereafter the members receive a copy of the official program at least a week prior to the date of meeting or that the titles of the papers should appear in the program in the order to be read, in the official organ about a month before the meeting, and that the preparation of the program be in the hands of the Executive Council. Seconded and carried.

Dr. Titus offered a resolution to the effect that the contract with the Publishers of the JOURNAL OF ADVANCED THERAPEUTICS be renewed as it now stands for a term of one year. Carried.

Dr. Brinkmann moved that a "Secretary's page" be provided for in the same journal. Carried.

SCIENTIFIC SESSION.

SECOND DAY, MORNING SESSION.

Dr. J. D. Gibson of Denver read a paper entitled Tubercular Antitoxin.

Dr. Martin L. Barshinger of York exhibited some patients and spoke upon his results obtained by the High-Frequency Currents in Pulmonary Tuberculosis.

The paper of Dr. Gibson and the remarks of Dr. Barshinger were discussed by Drs. Morris W. Brinkmann, New York; Henry W. Frauenthal, New York; Sinclair Tousey, New York; W. Benham Snow, New York; Edward C. Titus, New York; Fred De Kraft, New York, and closed by Dr. Gibson.

Dr. Samuel Spencer Wallian of New York City read a paper, Rhythm the Dominant Factor in Therapeutics and in the Organic World. The paper was discussed by Drs. T. S. Barber, Charleston, W. Va.; Dr. Morris W. Brinkmann, and closed by Dr. Wallian.

The paper by Dr. E. Gard Edwards of La Junta, Col., upon The Diagnostic Value of X-rays in Elbow Fractures, was read by title.

Dr. Sinclair Tousey of New York City read a paper on The Measurement of the Intensity of the Roentgen Ray an Element of Safety in Radiography and Uniformity in Therapeutics. The paper was discussed by Drs. Charles A. Donaldson; Dr. William T. Bishop of Harrisburg, and closed by Dr. Tousey.

Adjourned to 2.30 P. M. at the American Oncologic Hospital.

(To be continued.)

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